

FIG.1

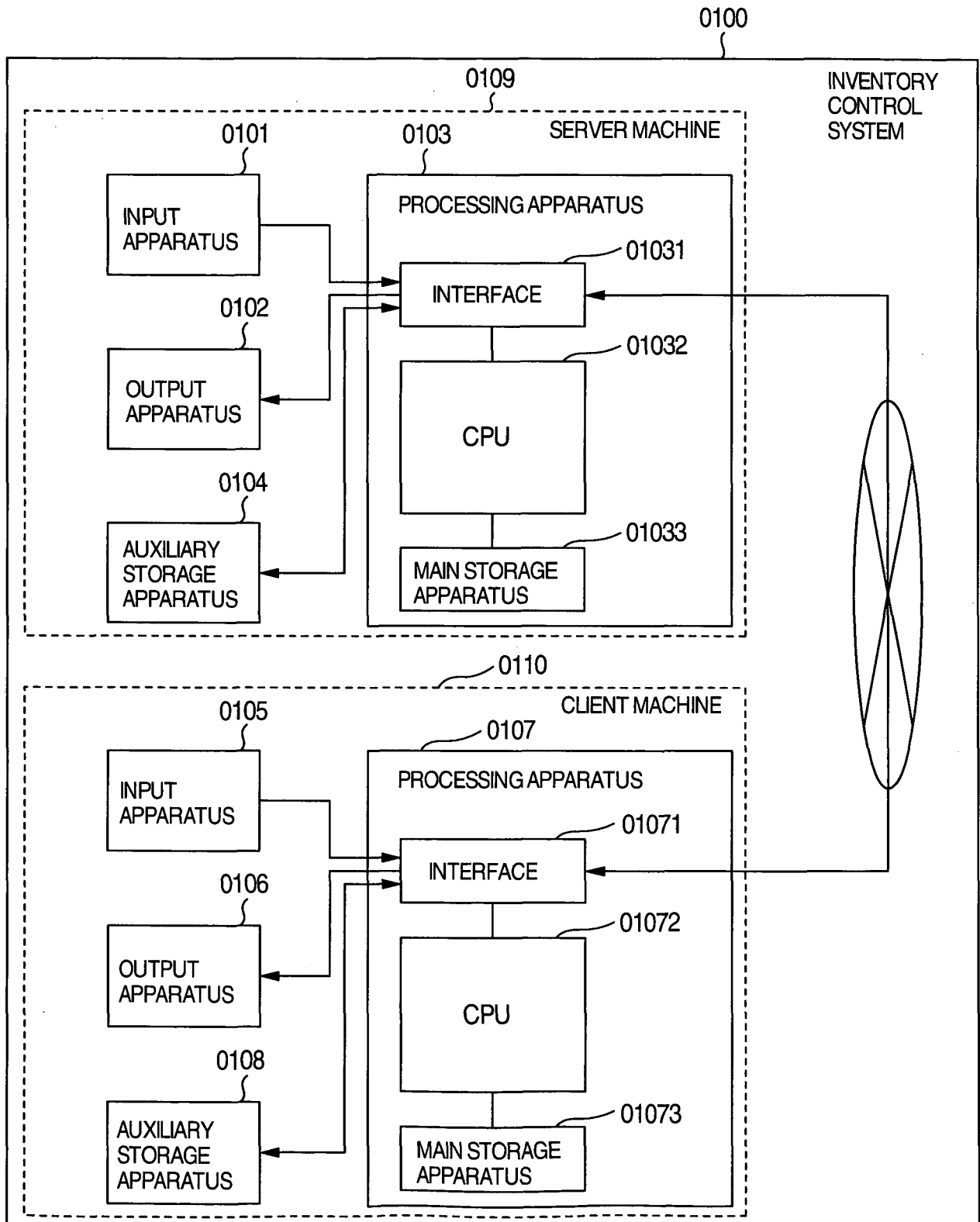


FIG.2

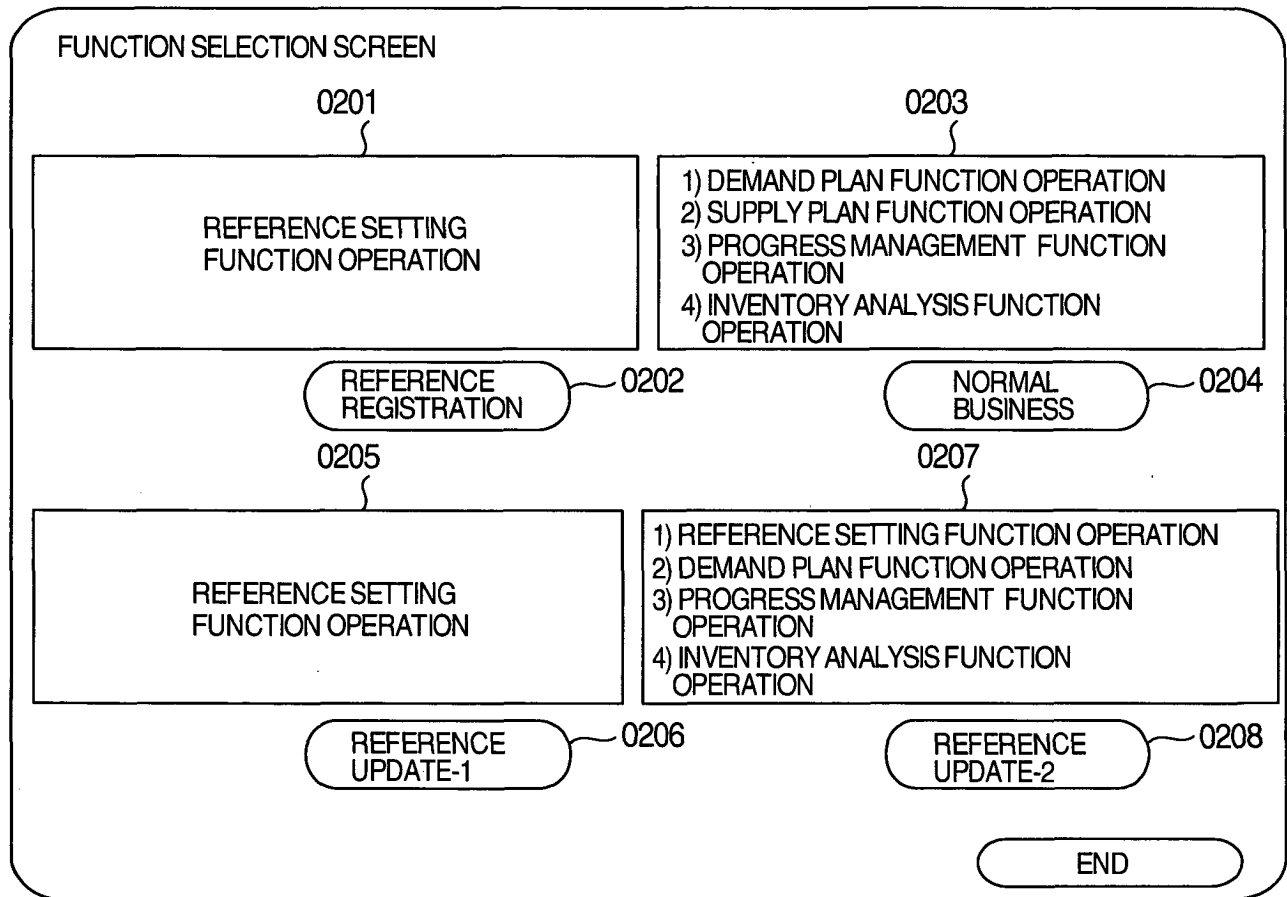


FIG.3

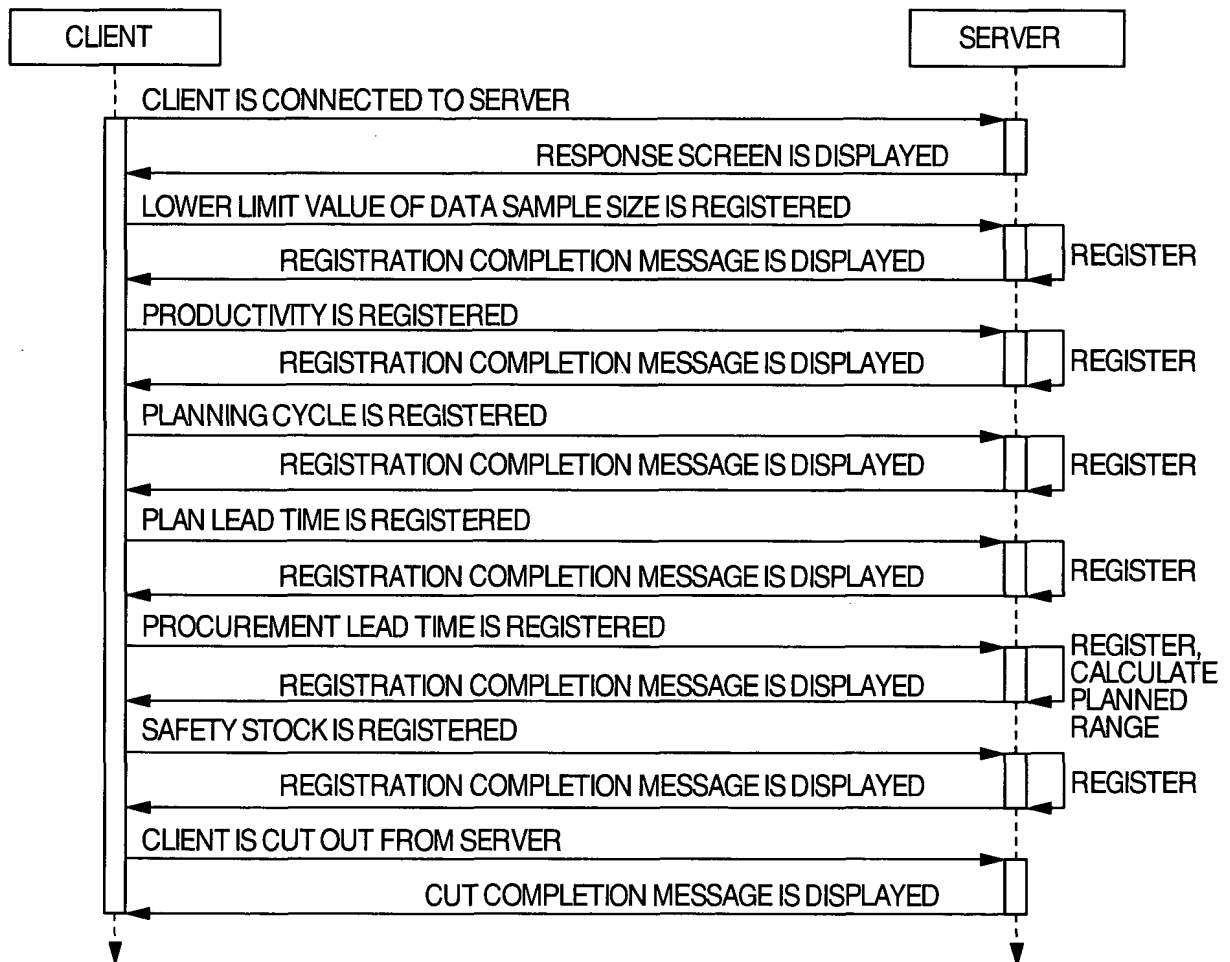


FIG.4

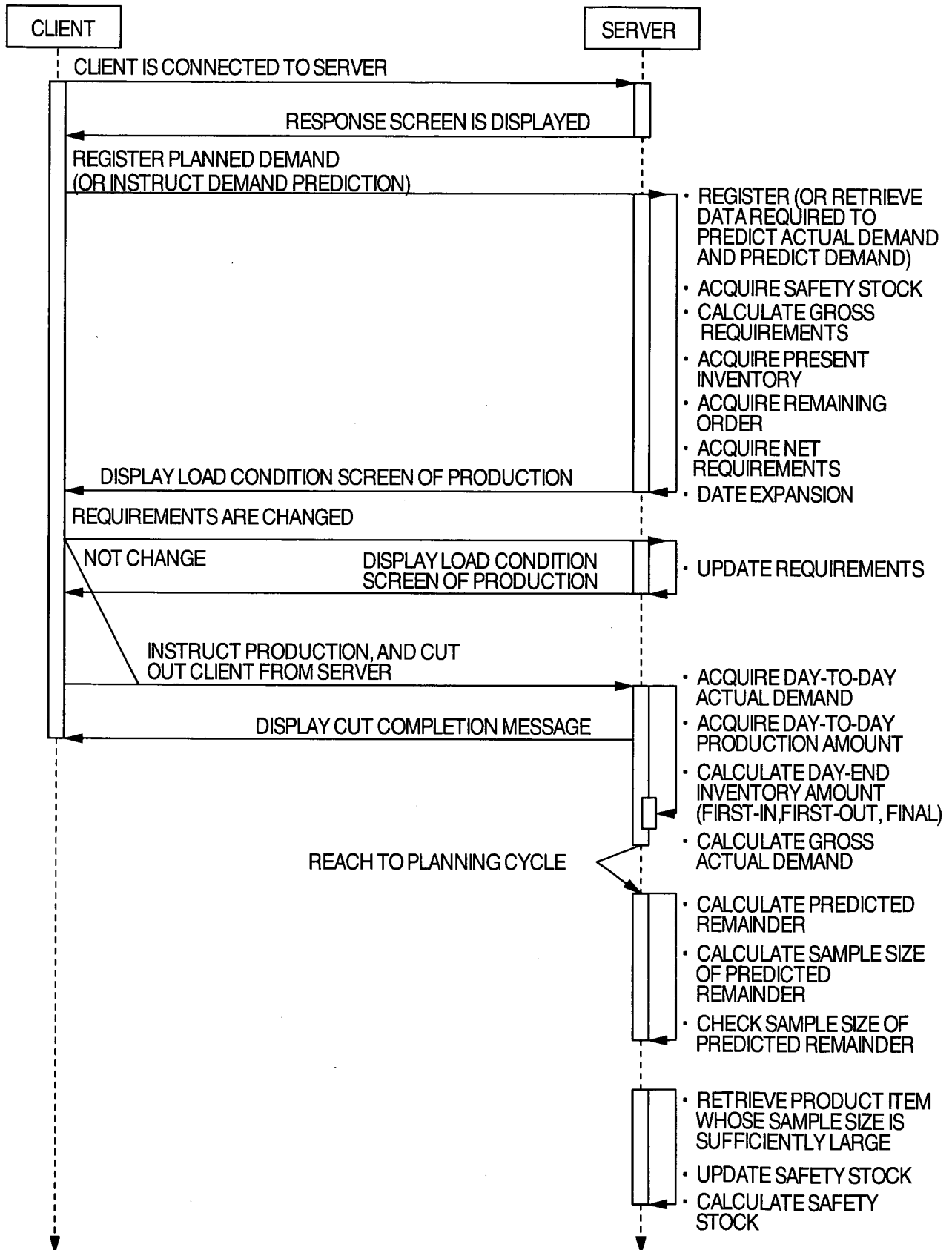


FIG.5

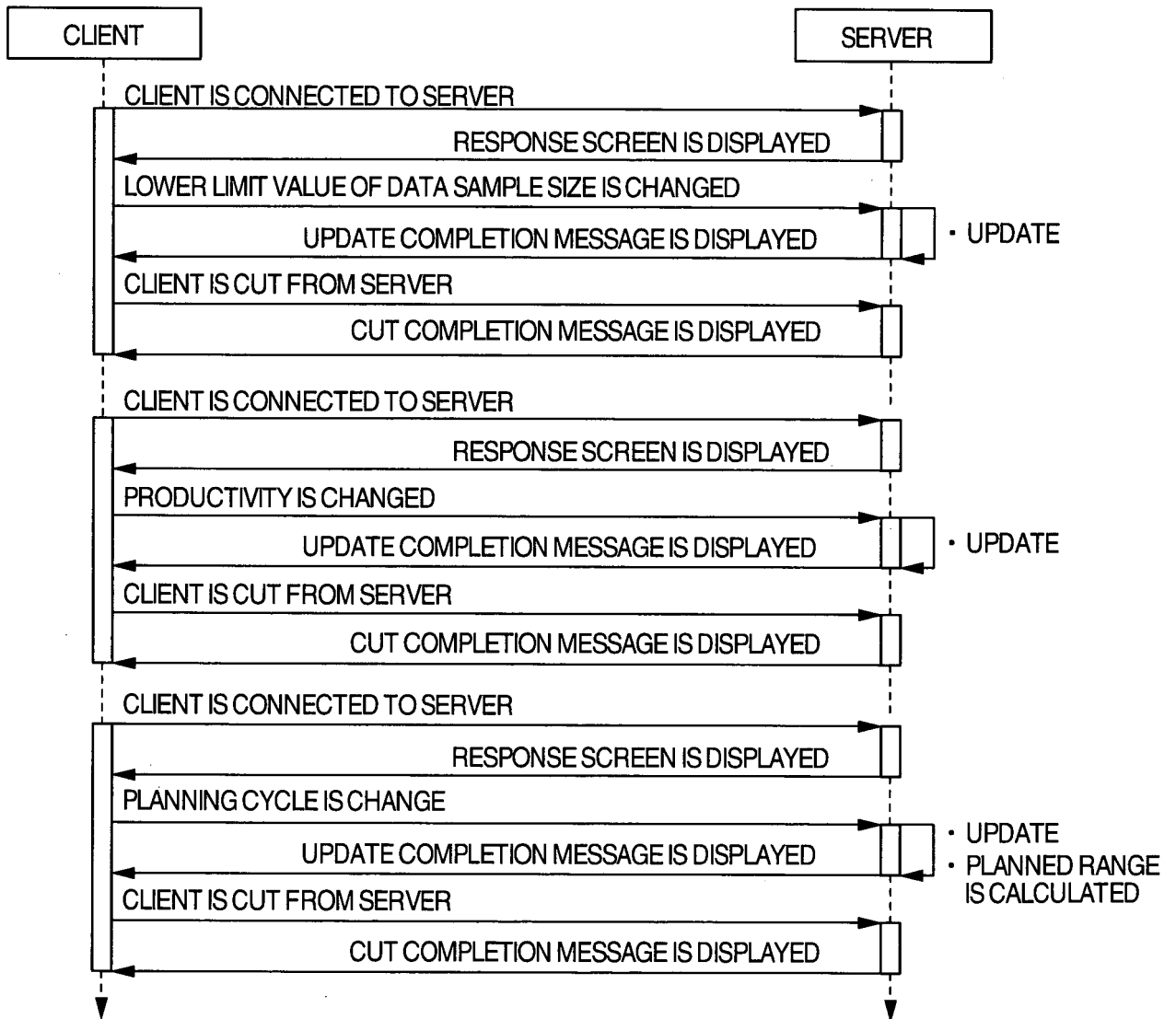


FIG.6

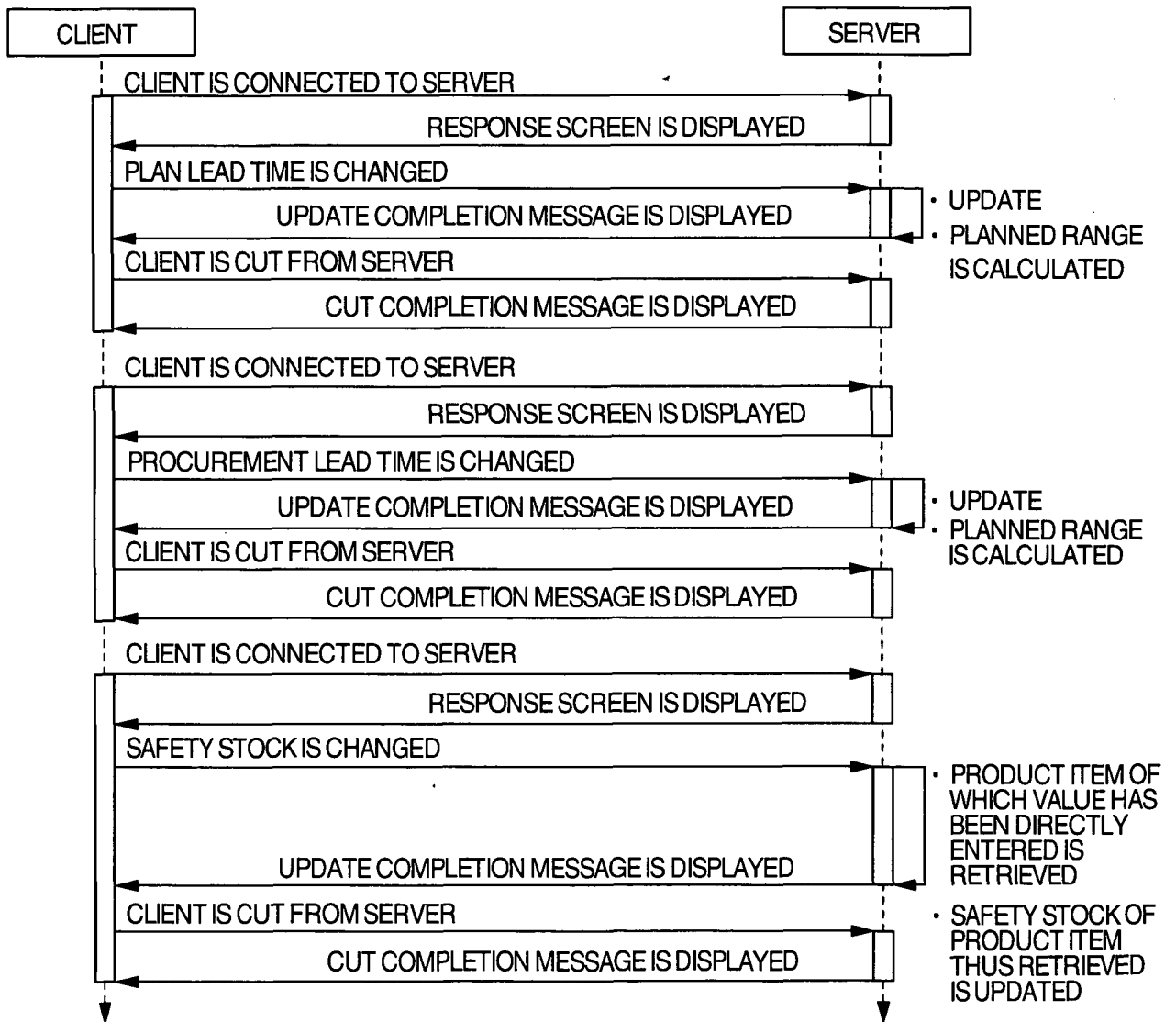


FIG.7

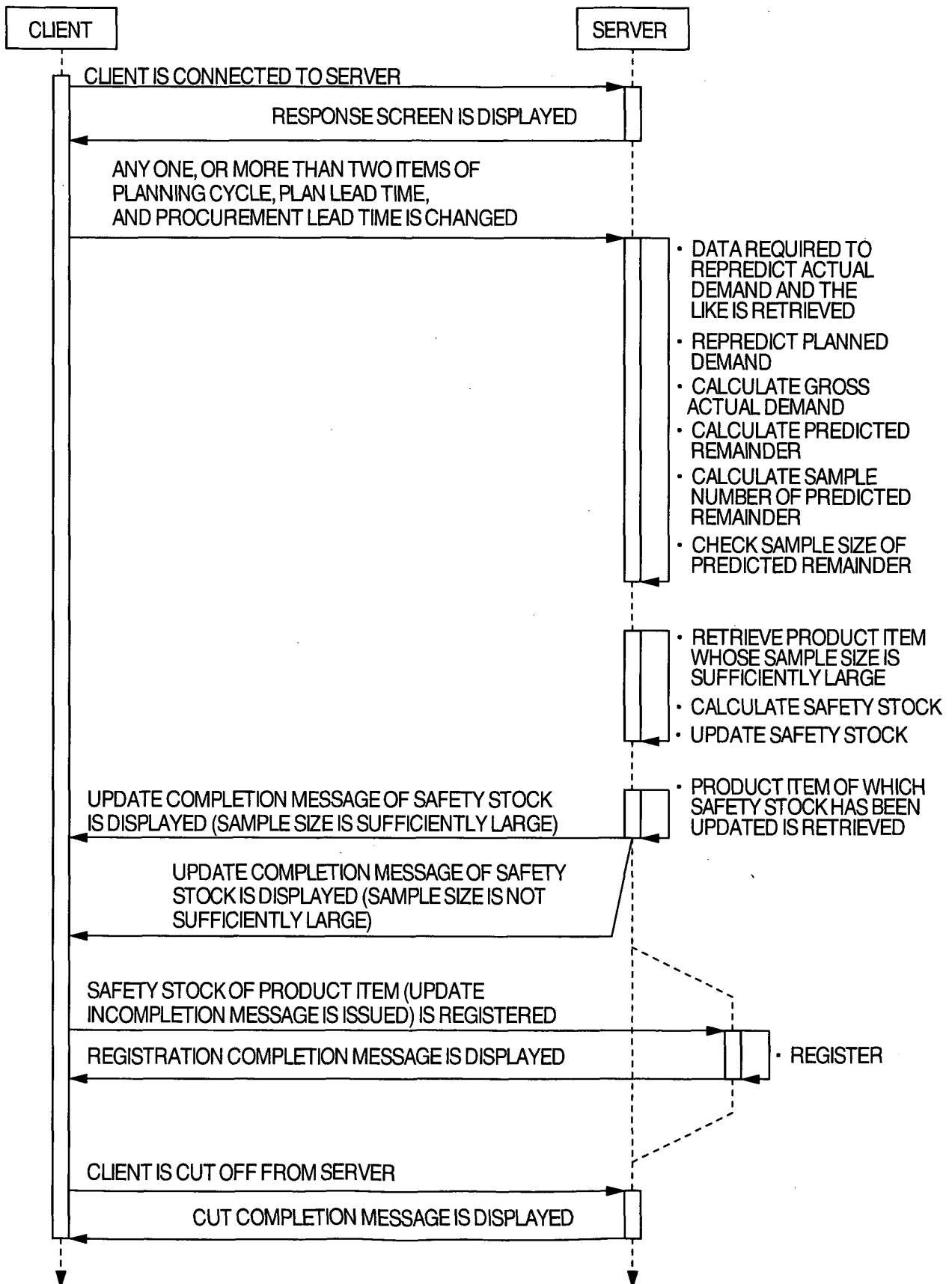


FIG.8

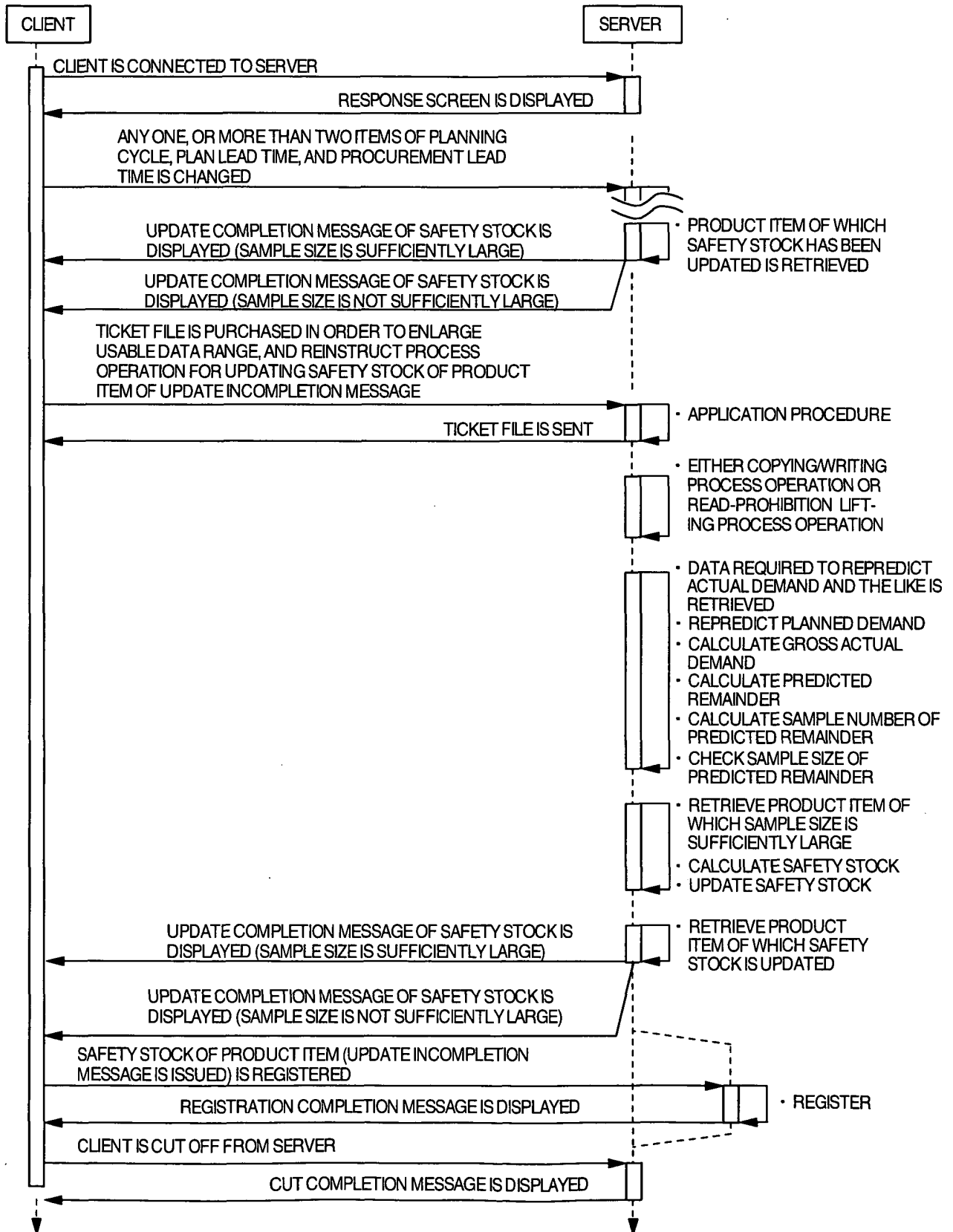


FIG.9

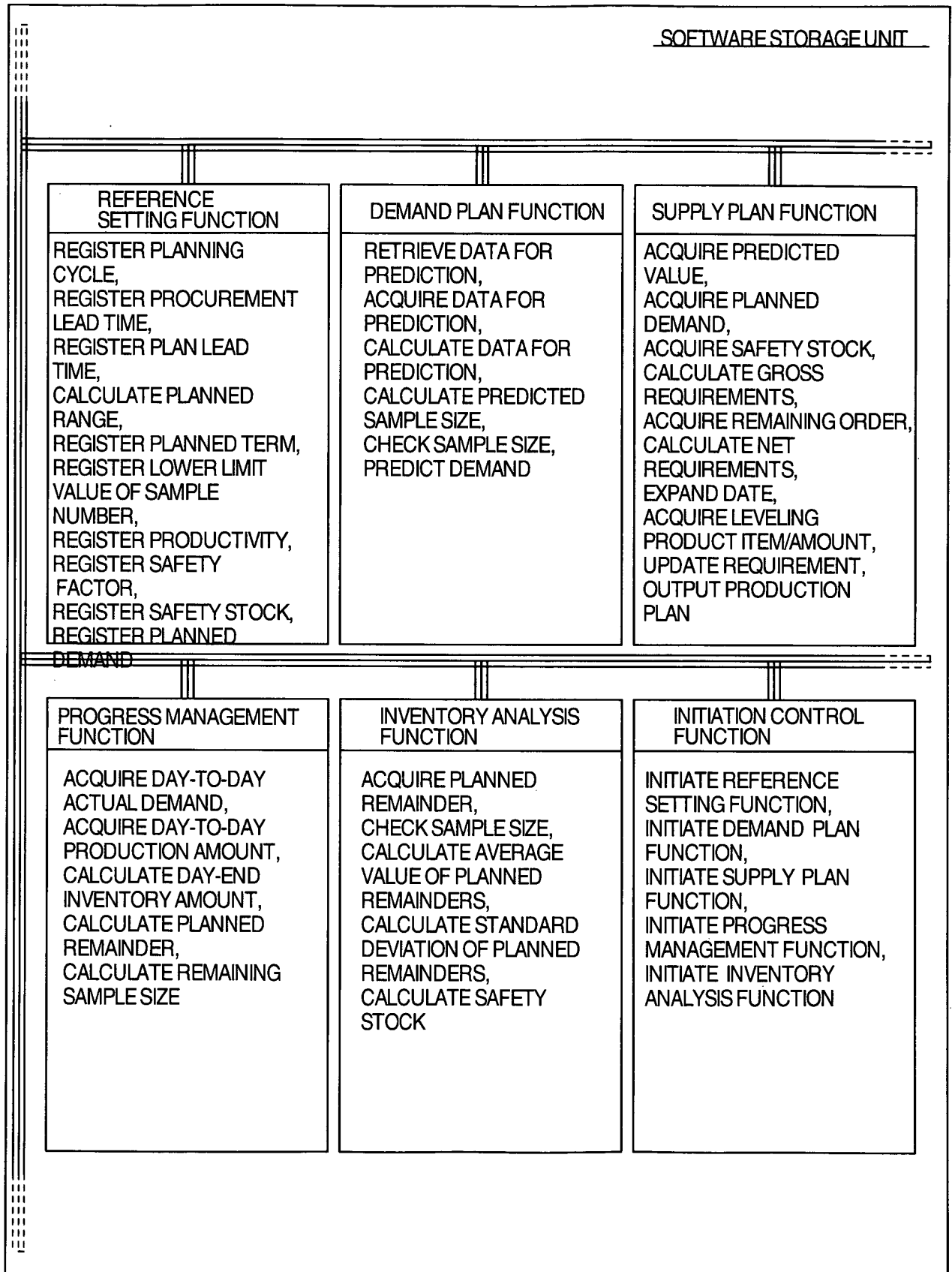
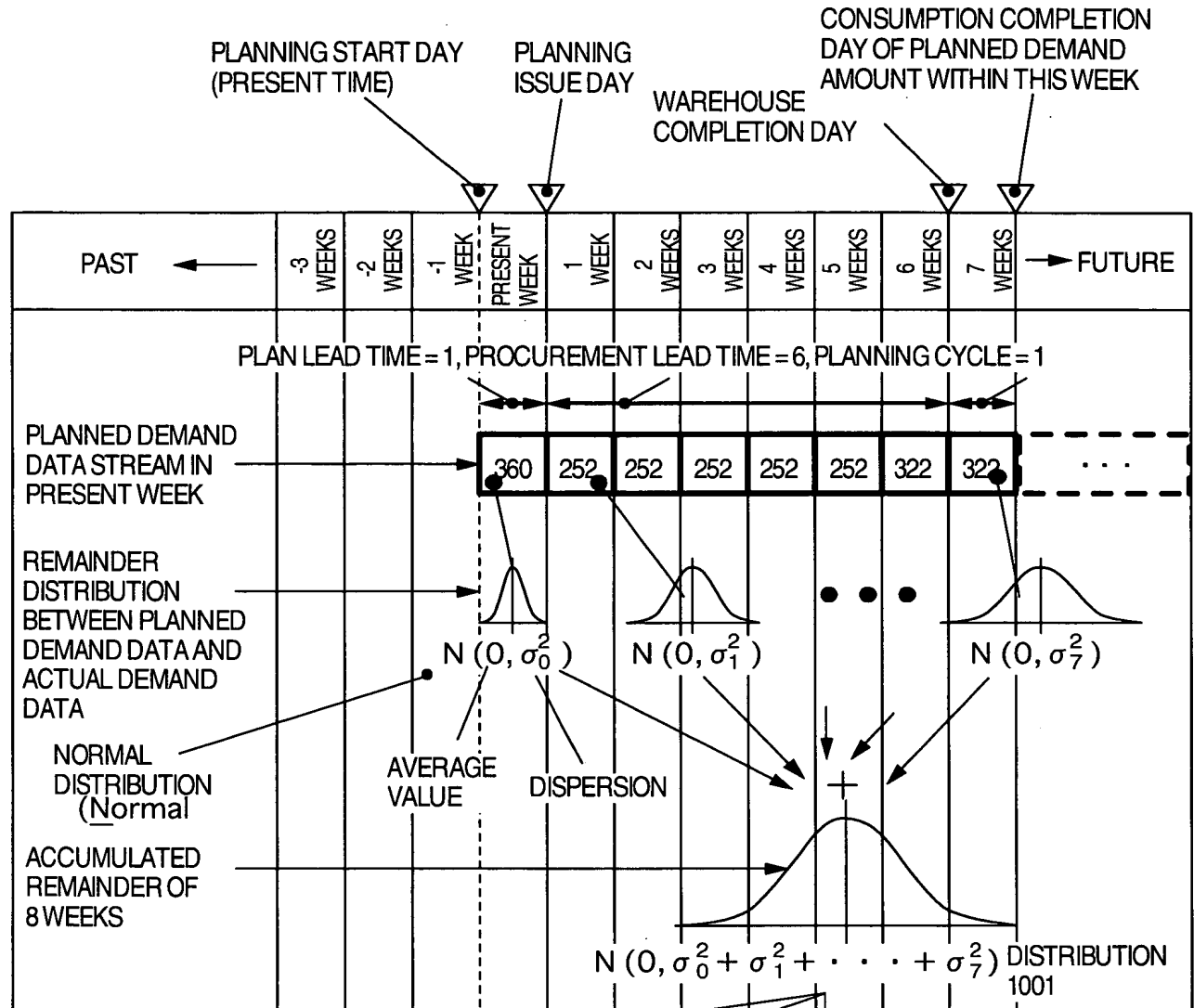


FIG.10

EXAMPLE: PLAN LEAD TIME = 1 WEEK, PROCUREMENT LEAD TIME = 6 WEEKS,
PLANNING CYCLE = 1 WEEK



ASSUMPTION 1

WHEN

$$\sigma_0^2 = \sigma_1^2 = \dots = \sigma_7^2$$

$$N(0, 8 \sigma_D^2)$$

$$\therefore \text{SAFETY STOCK} = \alpha \sqrt{8 \sigma_D^2}$$

α : SAFETY FACTOR

ASSUMPTION 2

WHEN

$$\sigma_0^2 = \sigma_1^2 = \dots = \sigma_6^2 = 0$$

$$\text{and } \sigma_7^2 = 0$$

$$N(0, \sigma_D^2)$$

$$\therefore \text{SAFETY STOCK} = \alpha \sqrt{1 \sigma_D^2}$$

ASSUMPTION 3

WHEN

$$\sigma_0^2 = \sigma_1^2 = \dots = \sigma_7^2$$

$$N(0, \sigma_0^2 + \sigma_1^2 + \dots + \sigma_7^2)$$

\therefore SAFETY STOCK

$$= \alpha \sqrt{\sigma_0^2 + \sigma_1^2 + \dots + \sigma_7^2}$$

...

FIG.11

INPUT DATA			
SAMPLE NUMBER	PLANNED DEMAND X	ACTUAL DEMAND Y	PREDICTED REMAINDER Z
...
9	2907	3217	-310

SINCE SUCH A TREND BECOMES CONSPICUOUS IN WHICH THE SMALLER THE SAMPLE SIZE IS, THE SMALLER THE VALUE OF S BECOMES THAN THE VALUE OF σ , THIS VALUE OF σ IS NOT SUBSTITUTED BY S

SAMPLE SIZE	$1/c_2$	COEFFICIENT FOR REDUCING ERROR
...
9	...	1.09
...

PROBABILITY OF 5% IMPLIES THAT WHEN THE SAFETY FACTOR " α " IS SELECTED TO BE 1.65, THE PRODUCT DEPLETION MAY OCCUR 5 TIMES WITH PLANNED 100 TIMES

VALUE OF α	2.05	1.95	1.65
PROBABILITY OF PRODUCT DEPLETION	2%	25%	5%

CALCULATION SEQUENCE OF SAFETY STOCK (EXAMPLE)

CALCULATE SAMPLE SIZE "n" OF PREDICTED REMAINDER Z

① CALCULATION OF SAMPLE MEAN
$$\bar{z} = \frac{\sum_{i=1}^n z_i}{n}$$

② CALCULATION OF SUM OF SQUARED DEVIATION
$$S = \sum_{i=1}^n (z_i - \bar{z})^2$$

③ CALCULATION OF SAMPLE VARIANCE
$$s^2 = \frac{S}{n}$$

④ CALCULATION OF SAMPLE STANDARD DEVIATION
$$s = \sqrt{s^2}$$

⑤ WHEN SAMPLE SIZE IS SMALL, COEFFICIENT FOR REDUCING ERROR IS CALCULATED

⑥ CALCULATION OF POPULATION STANDARD DEVIATION
$$\sigma = s \times \frac{1}{c_2}$$

⑦ SETTING OF SAFETY FACTOR

⑧ CALCULATION OF SAFETY STOCK = ⑦ x ⑧

FIG.12

INFORMATION OF DEMAND
OF PARTS NUMBER A01

TIMING OBTAINED
BELOW-MENTIONED INFORMATION

	TIME	DATE	DEMAND AMOUNT		PLANNED DEMAND	ACTUAL DEMAND	PREDICTED REMAINDER	STANDARD DEVIATION
	t-m	1990/01/01	20					
	t-m+1	1990/01/02	15					
	t-m+2	1990/01/03	22					
	t-i	1999/01/01	31					
	t-2	2000/12/30	51					
	t-1	2000/12/31	14					
PAST ↑								
PRESENT TIME	t	2000/01/01	23		750			
	t+1	2001/01/02	46					
	t+2	2001/01/03	27					
	t+3	2001/01/04	43					
	t+13	2001/01/14	35			770	20	
	t+20	2001/01/21	22					
	t+27	2001/01/28	12					
	t+34	2001/02/04	56					
	t+j	20XX/XX/XX	47					50
FUTURE ↓								

FIG.13

INFORMATION OF DEMAND OF PARTS NUMBER A01			TIMING OBTAINED BELOW-MENTIONED INFORMATION			
TIME	DATE	DEMAND AMOUNT	PLANNED DEMAND	ACTUAL DEMAND	PREDICTED REMAINDER	STANDARD DEVIATION
t-m	1990/01/01	20				
t-m+1	1990/01/02	15				
t-m+2	1990/01/03	22				
t-i	1999/01/01	31				
t-2	2000/12/30	51				
t-1	2000/12/31	14				
PRESENT TIME	t	2001/01/01				50
	t+1	2001/01/02				
	t+2	2001/01/03				
	t+3	2001/01/04				
	t+13	2001/01/14				
	t+20	2001/01/21				
	t+27	2001/01/28				
	t+34	2001/02/04				
	t+j	20XX/XX/XX				

PAST

FUTURE

750

770

20

50

FIG.14

(1) IN CASE THAT SAFETY STOCK IS AUTOMATICALLY UPDATED IN NORMAL BUSINESS BASE

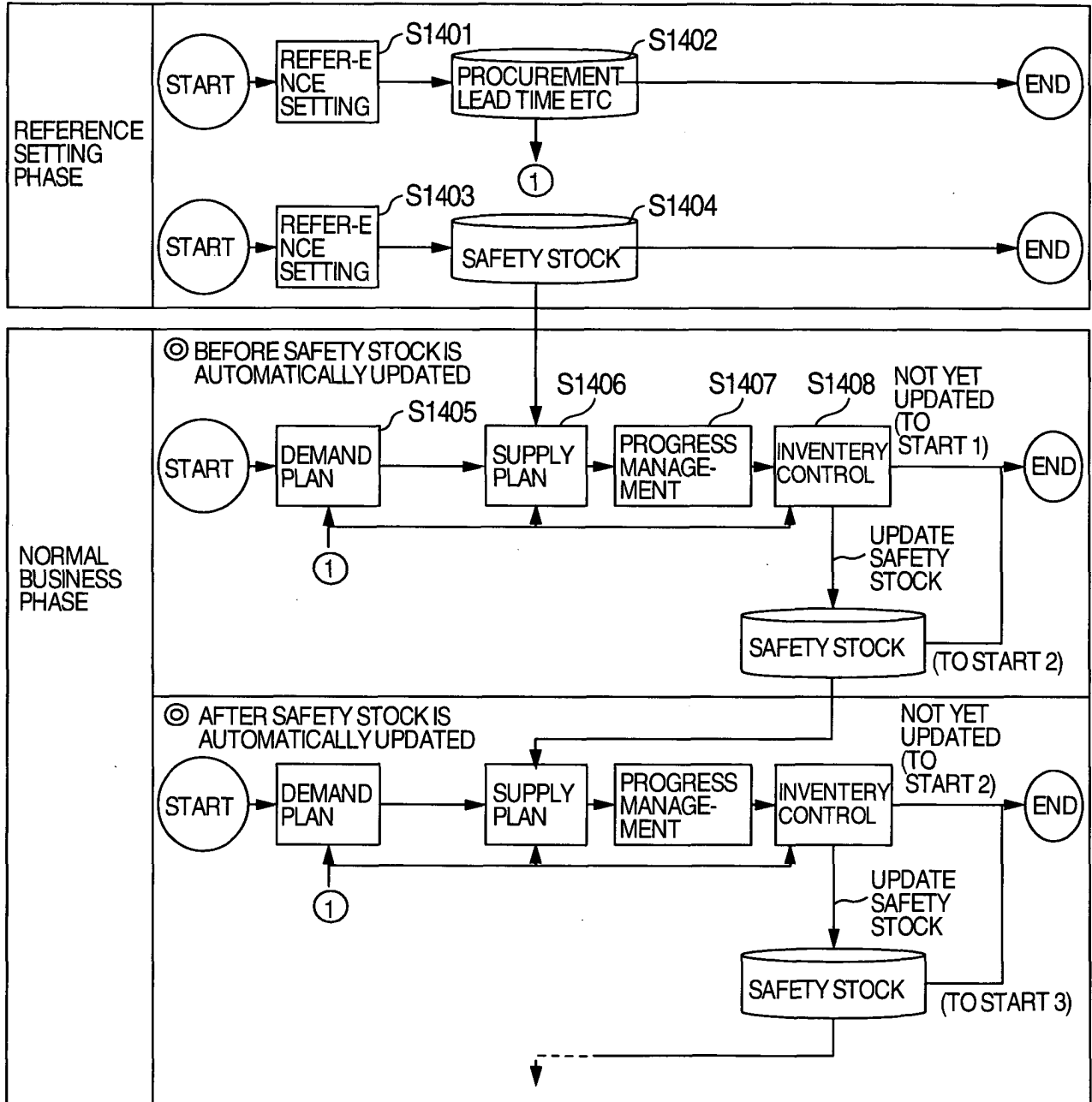


FIG.15

(2) IN CASE THAT SAFETY STOCK IS MANUALLY UPDATED IN CONNECTION WITH CHANGE IN SETTING VALUES SUCH AS PROCUREMENT LEAD TIME

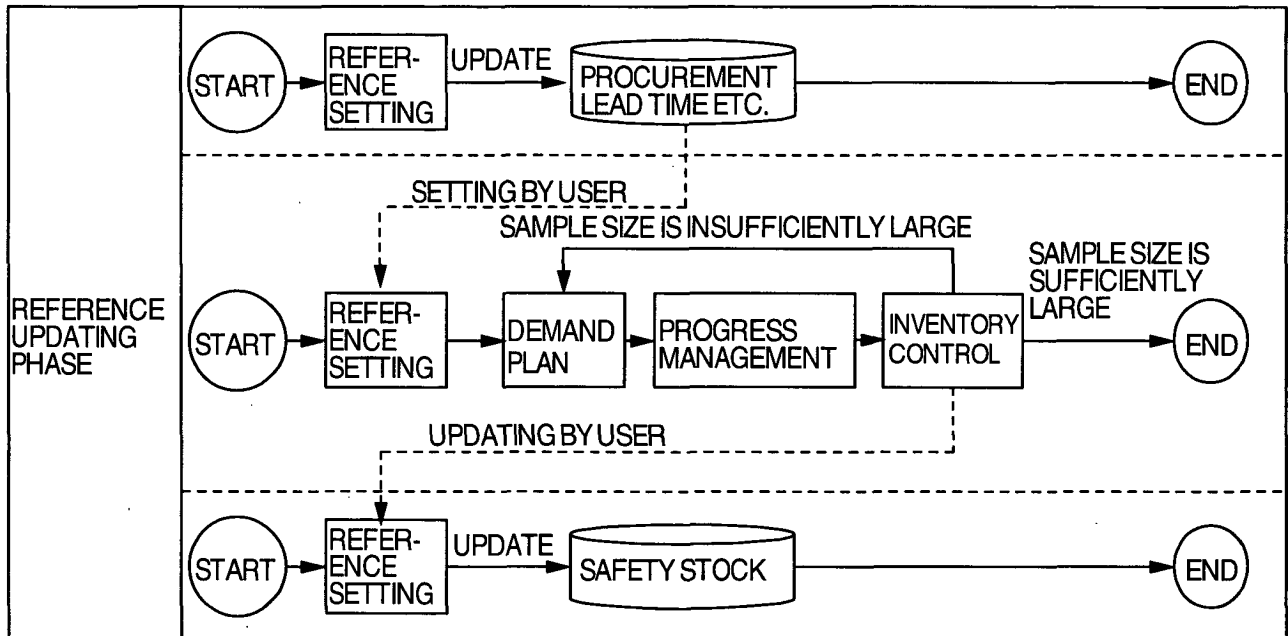


FIG.16

(3) IN CASE THAT SAFETY STOCK IS AUTOMATICALLY UPDATED IN CONNECTION WITH CHANGE IN SETTING VALUES SUCH AS PROCUREMENT LEAD TIME;

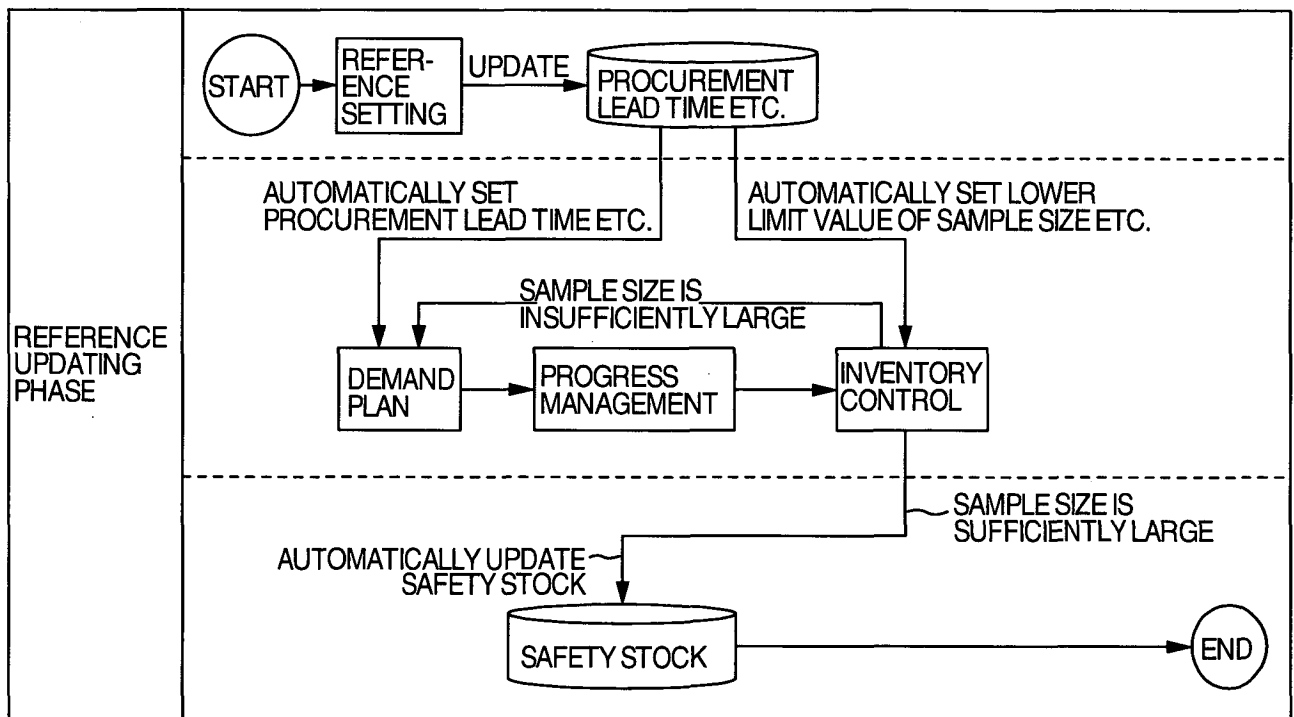


FIG.17A

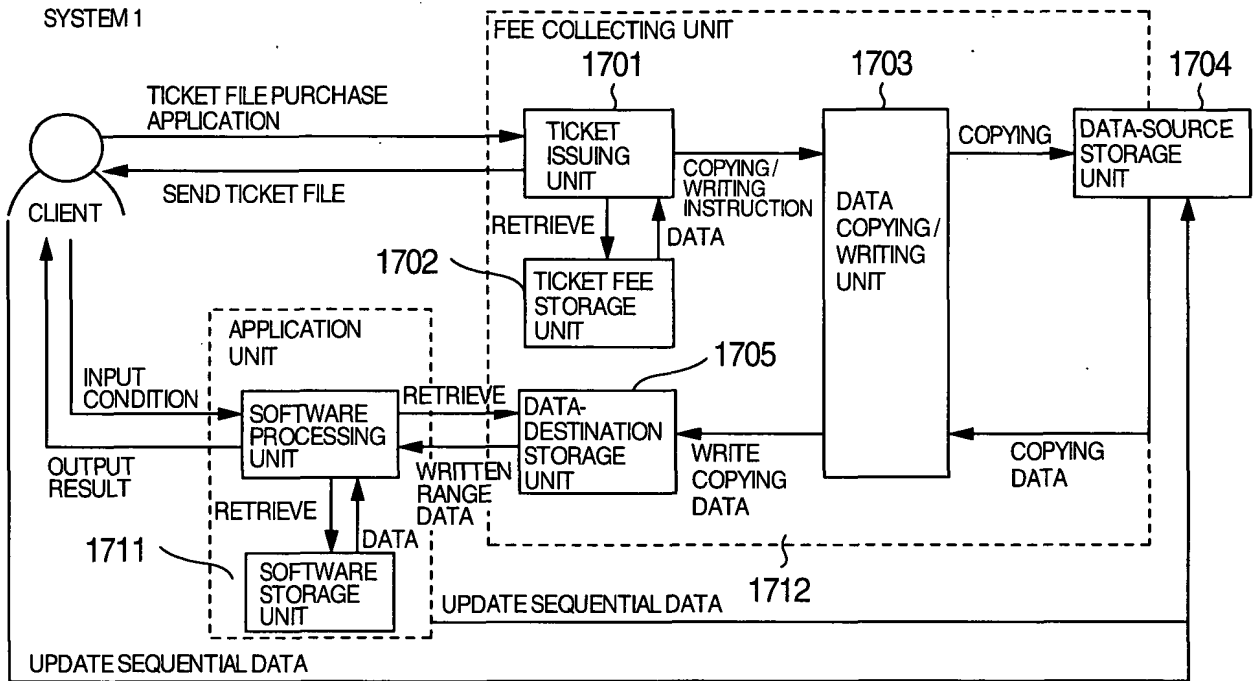


FIG.17B

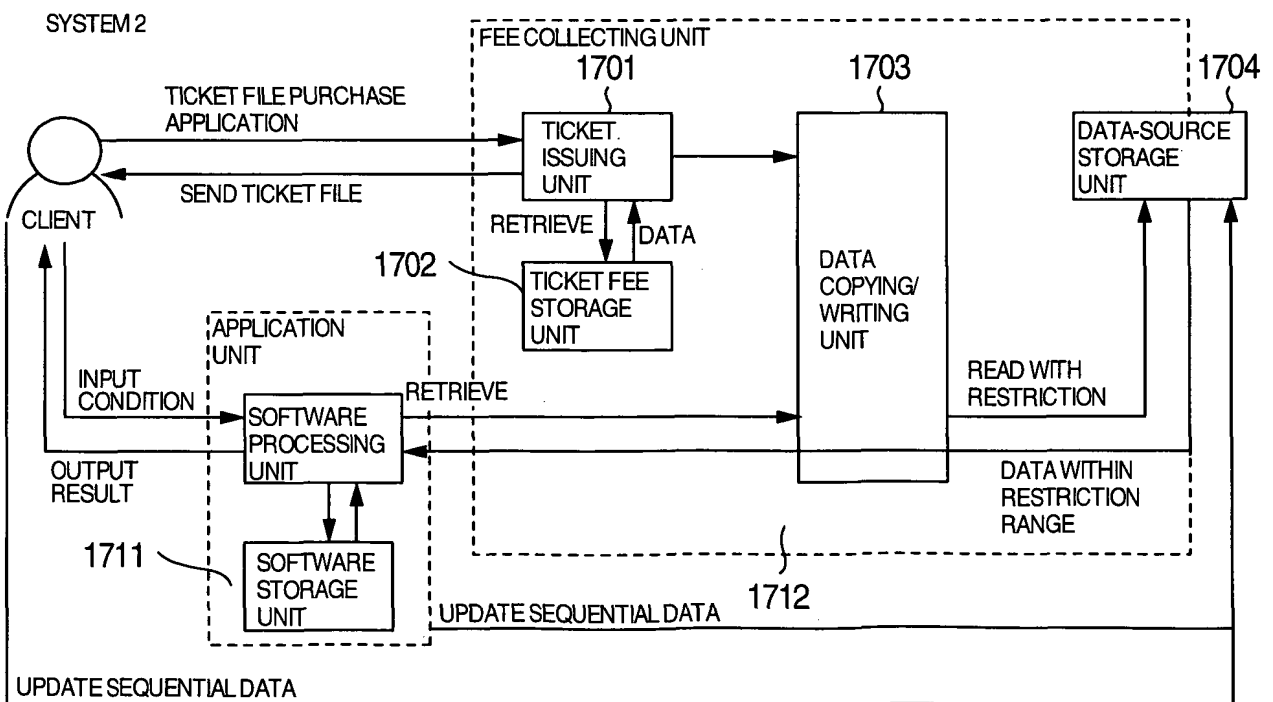


FIG.18

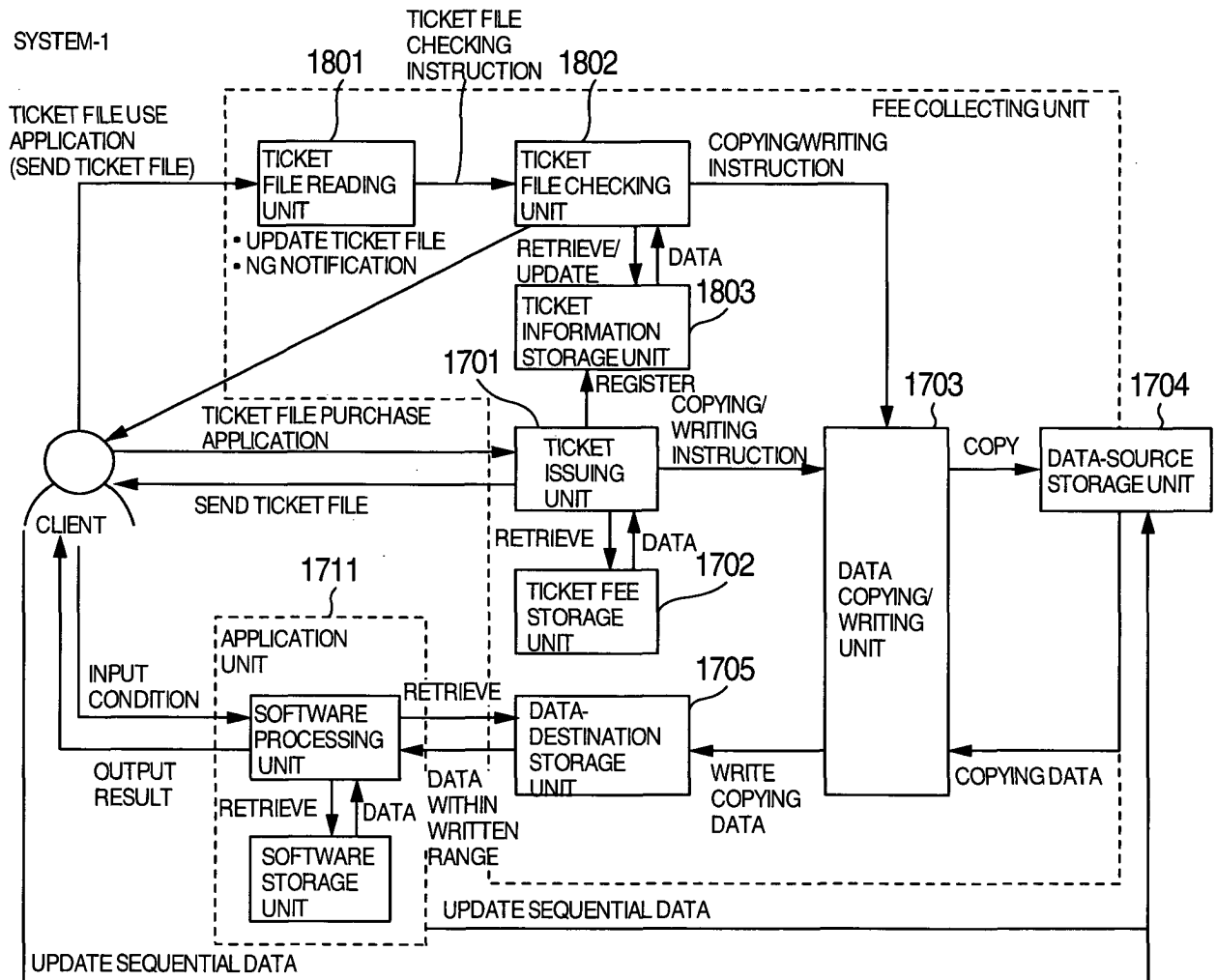


FIG.19

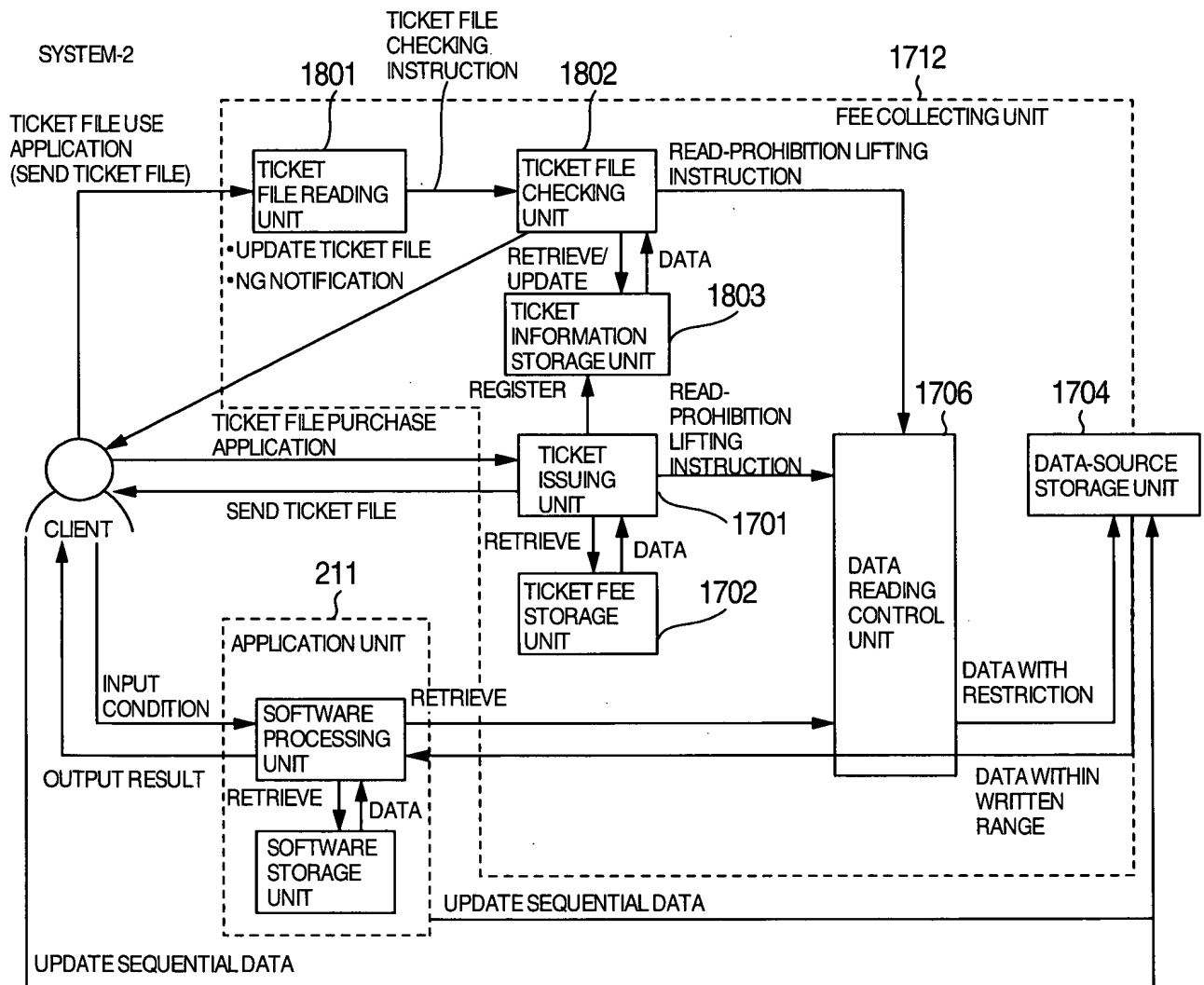


FIG.20

SYSTEM-1

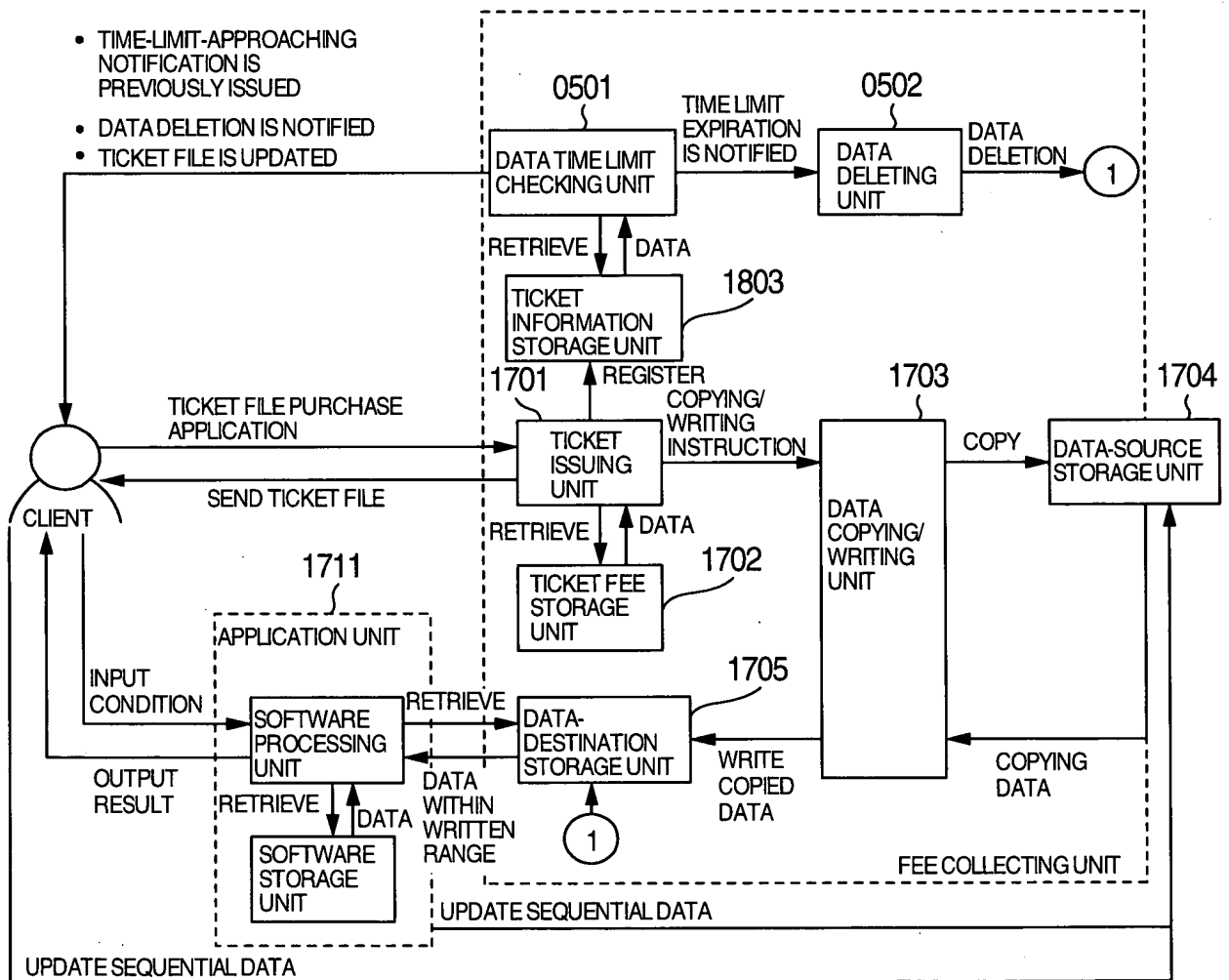


FIG.21

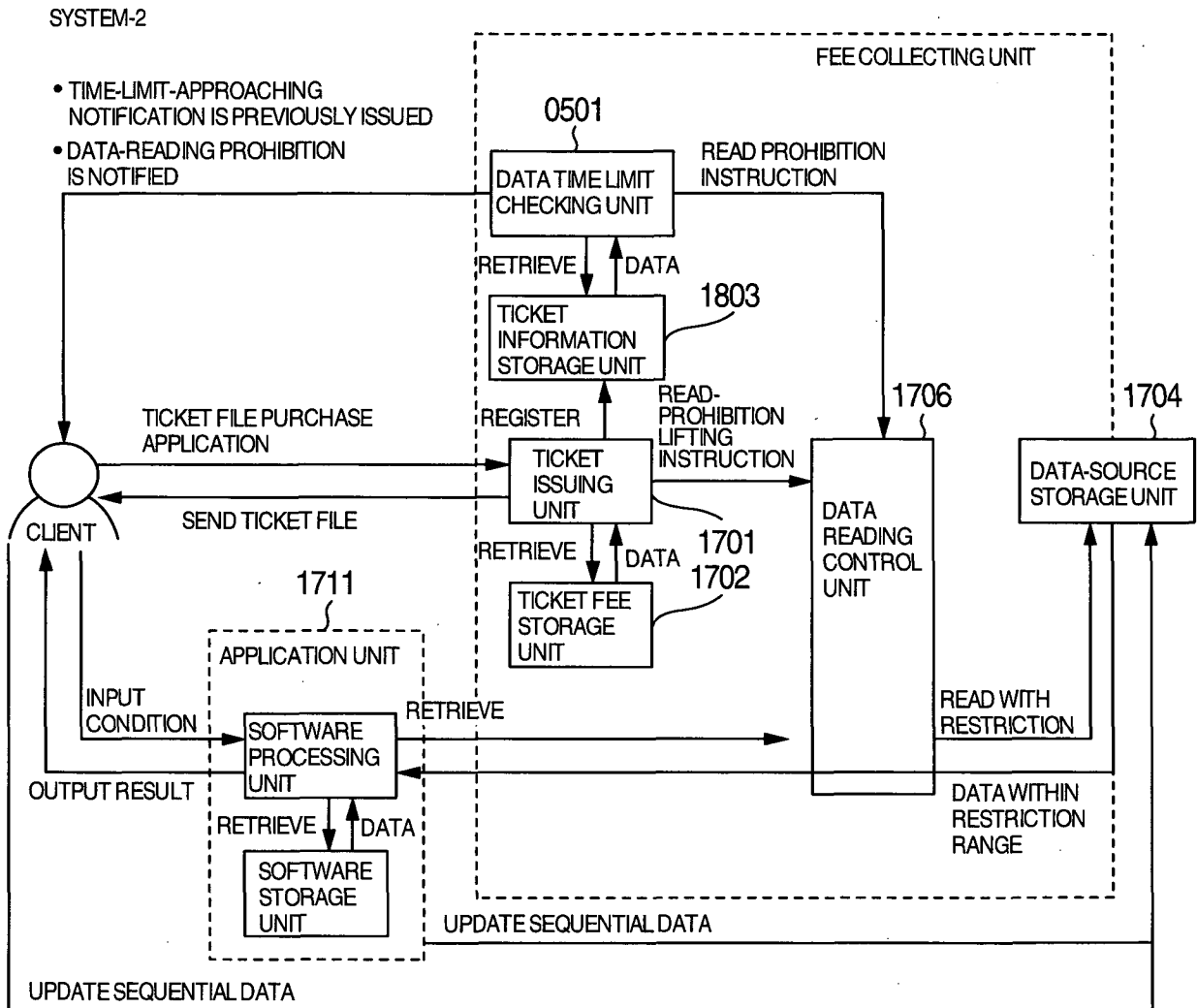


FIG.22

TICKET FILE

TICKET FILE NUMBER : 000001

(1) USER NUMBER	: abcdefg
(2) CALCULATION SYSTEM	: SYSTEM 1A (2001/01/05)
(3) USE FUNCTION NAME	: SUPPLY PLAN, INVENTORY ANALYSIS
(4) TABLE DESIGNATION	: WAREHOUSING/SHIPPING HISTORY TABLE, WAREHOUSING/SHIPPING ASSUMPTION TABLE
(5) RECORD RESTRICTION	: FIXED (II AREA) (1999/01/01~2003/01/01)
(6) COLUMN RESTRICTION	: NO
(7) DATA USE TIME LIMIT	: DESIGNATE (2001/04/12)
(8) TIME-LIMIT APPROACHING NOTIFICATION	: YES
(9) NOTIFICATION TIMING	: FIXED (ONE DAY BEFORE TIME LIMIT)
(10) DATA UPDATE	: YES
(11) NUMBER OF TIMES OF DATA UPDATING	: FIXED (10 TIMES)
(12) TICKET FILE IS USED AFTER TICKET PURCHASE	: USE LATER

◎ TOTAL TICKET FILE FEE : 2,226 YEN

(DETAILS)

• DATA COPYING/Writing FEE (SYSTEM 1A)	: 1,000 YEN
• DATA READING CANCEL FEE (SYSTEM 2)	: 1,010 YEN
• TIME-LIMIT-APPROACHING FEE	: 10 YEN
• DATA UPDATING FEE	: 100 YEN
• CONSUMPTION TAX	: 106 YEN

• • •

FIG.23

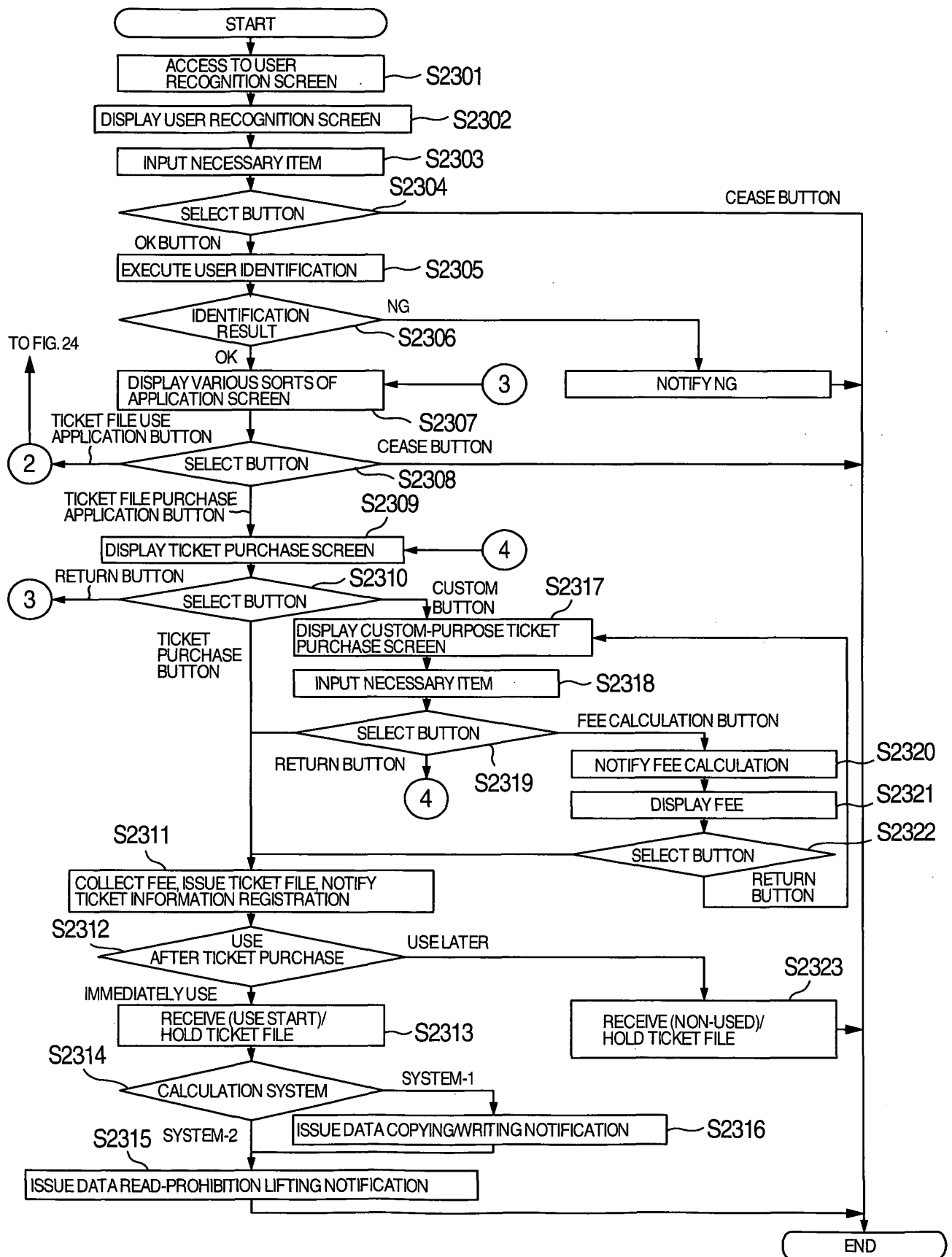


FIG.24

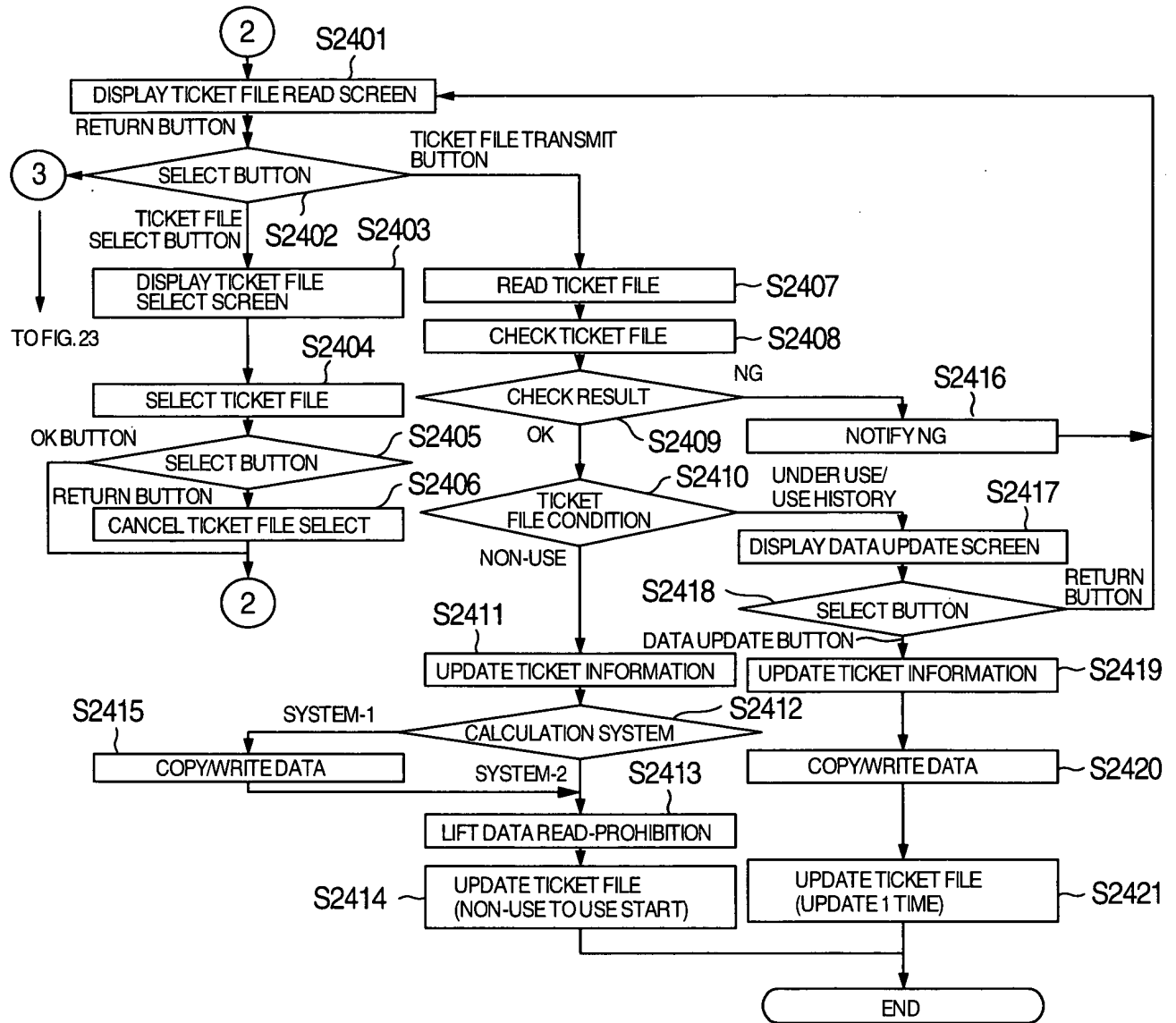


FIG.25

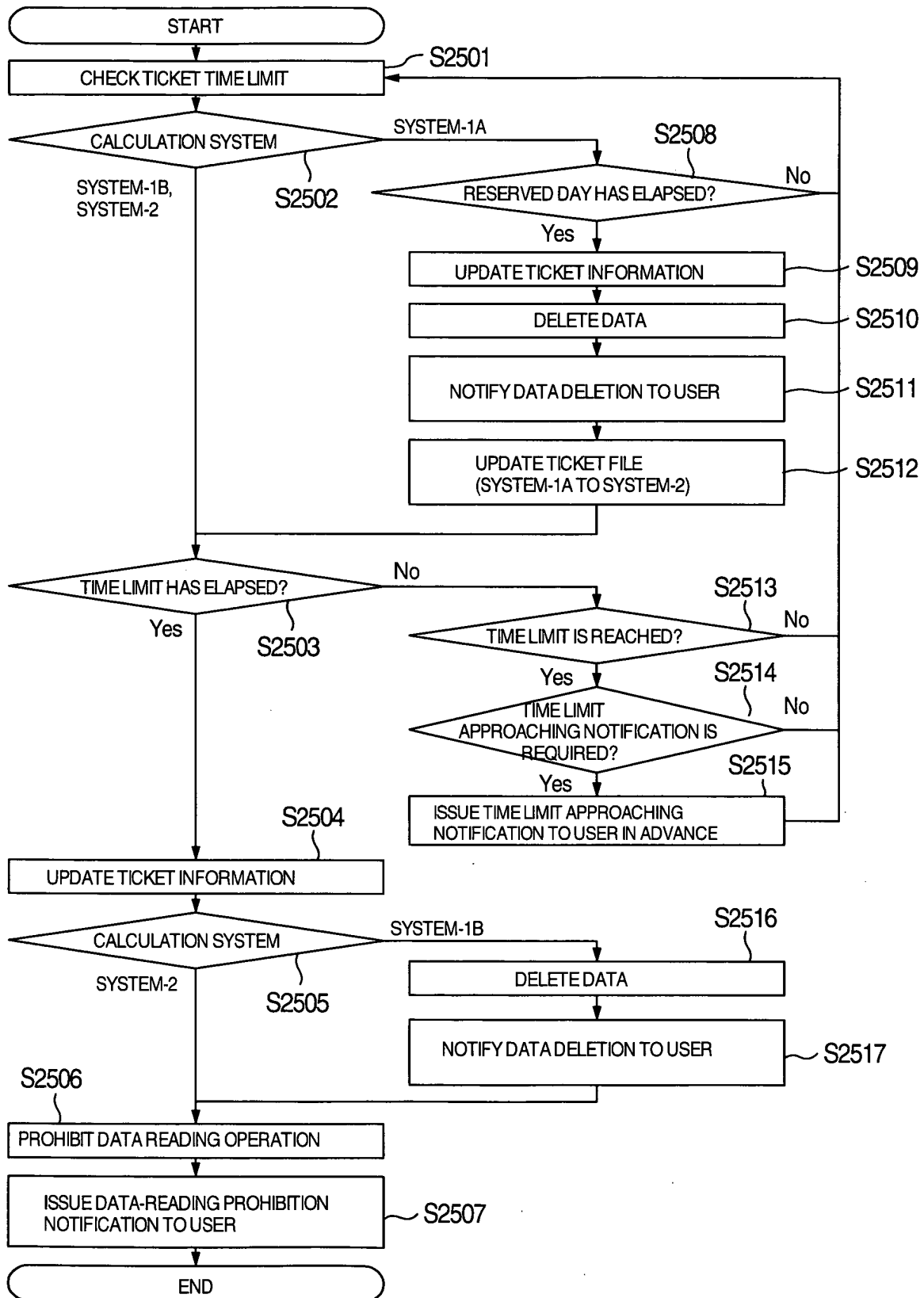


FIG.26A

USER IDENTIFICATION SCREEN

USER NUMBER :

PASSWORD :

•

•

•

FIG.26B

APPLICATION SCREEN

FIG.27

TICKET FILE PURCHASE SCREEN

No	CALCU- LATION SYSTEM	USABLE FUNCTION TITLE	TABLE DESIGNATION	RECORD RESTRICTION	...	PURCHASE UNIT	USE STARTING DAY OF TICKET FILE (USE TERM)	REMAINING TICKET FILE NUMBER	FEE	TICKET FILE PURCHASE
1	1B	STOCK ANALYSIS	NO DESIGNATION	NO RESTRICTION	...	10 SHEETS	NO DESIGNATION (2 DAYS)	100 SHEETS	2,000 YEN	TICKET FILE PURCHASE
2	2	NO DESIGNATION	NO DESIGNATION	OTHER THAN AREA	...	1 SHEET	NO DESIGNATION (30 DAYS)	NO LIMITATION	300 YEN	TICKET FILE PURCHASE
3	1B	STOCK ANALYSIS, PRODUCTION PLAN	NO DESIGNATION	NO RESTRICTION	...	1 SHEET	NO DESIGNATION (7 DAYS)	10 SHEETS	500 YEN	TICKET FILE PURCHASE
4	1B	NO DESIGNATION	NO DESIGNATION	NO RESTRICTION	...	1 SHEET	2001/08 (7 DAYS)	20 SHEETS	500 YEN	TICKET FILE PURCHASE
5	1A	NO DESIGNATION	NO DESIGNATION	NO RESTRICTION	...	1 SHEET	2001/01/06 (1 DAYS)	5 SHEETS	700 YEN	TICKET FILE PURCHASE
.	
.	
.	

RETURN

CUSTOM

FIG.28

CUSTOM-PURPOSE TICKET PURCHASING SCREEN

(1) USER NUMBER :

(2) CALCULATION SYSTEM :

SYSTEM 1A: SERVER MACHINE "γ" IS USED (RESERVATION)

☐ SYSTEM-1B: EMPTY SERVER MACHINE "γ" IS USED
(PARALLEL CALCULATION IS EXECUTED UNDER EMPTY CONDITION)

☐ SYSTEM-2 : CALCULATION IS PERFORMED ONLY BY SERVER MACHINE "β"

(3) USE FUNCTION NAME:

☐ DEMAND PLAN

☐ SUPPLY PLAN

☐ INVENTORY ANALYSIS

...

(4) TABLE DESIGNATION:

DESIGNATE

☐ NOT DESIGNATE (ONLY HISTORY TABLE)

(5) RECORD RESTRICTION : ~

☐ DESIGNATE

FIXED (a: 2 YEARS BEFORE PRESENT TIME [1999/01/01], b: 2 YEARS AFTER PRESENT TIME [2003/01/01])

☐ I AREA (SMALLER THAN "a") : USED TO VERIFY PREDICTION PRECISION

☐ II AREA (LARGER THAN, OR EQUAL "a" AND SMALLER THAN "b") : USED IN INVENTORY PREDICTION, SHORT-TERM DETAIL INVENTORY PLAN, AND THE LIKE

☐ III AREA (LARGER THAN, OR EQUAL TO "b") : USED IN LONG-TERM MASTER INVENTORY PLAN AND THE LIKE

☐ NO

(6) COLUMN RESTRICTION : ☐ YES ☒ NO

(7) DATA USE TIME LIMIT: ☒ DESIGNATE ☐ FIXED (1 MONTH)

(8) TIME LIMIT APPROACHING NOTIFICATION: ☒ YES ☐ NO

(9) TIMING OF NOTIFICATION: ☐ DESIGNATE ☒ FIXED (ONE DAY BEFORE TIME LIMIT)

(10) DATA UPDATE: ☒ YES ☐ NO

(11) DATA UPDATE TIME: ☐ DESIGNATE ☒ FIXED (10 TIMES)

(12) TICKET FILE IS USED AFTER TICKET FILE PURCHASE: ☐ IMMEDIATELY USE ☒ USE LATER

RETURN

CALCULATE FEE

PURCHASE TICKET FILE

FIG.29

SERVER MACHINE- γ RESERVATION CONDITION SCREEN

DATE	γ^1 (HIGH PERFORMANCE MACHINE)	γ^2 (HIGH PERFORMANCE MACHINE)	γ^3 (HIGH PERFORMANCE MACHINE)	γ^i (MEDIUM PERFORMANCE MACHINE)	...
2001/01/01	RESERVED	RESERVED	EMPTY	EMPTY	...
2001/01/02	RESERVED	RESERVED	RESERVED	EMPTY	...
2001/01/03	RESERVED	RESERVED	EMPTY	EMPTY	...
2001/01/04	RESERVED	RESERVED	RESERVED	EMPTY	...
2001/01/05	RESERVATION APPLICATION	EMPTY	RESERVED	RESERVED	...
2001/01/06	EMPTY	EMPTY	EMPTY	RESERVED	...
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:

RETURN

OK

FIG.30

TICKET FILE FEE

TOTAL TICKET FILE FEE AMOUNT : 2,226 YEN

(DETAILS)

- DATA COPYING/WRITING FEE (SYSTEM 1A) : 1,000 YEN
- DATA READ-PROHIBITION LIFTING FEE (SYSTEM 2) : 1,010 YEN
- TIME LIMIT APPROACHING NOTIFICATION FEE : 10 YEN
- DATA UPDATING FEE : 100 YEN
- CONSUMPTION TAX : 106YEN

RETURN

TICKET FILE PURCHASE

FIG.31

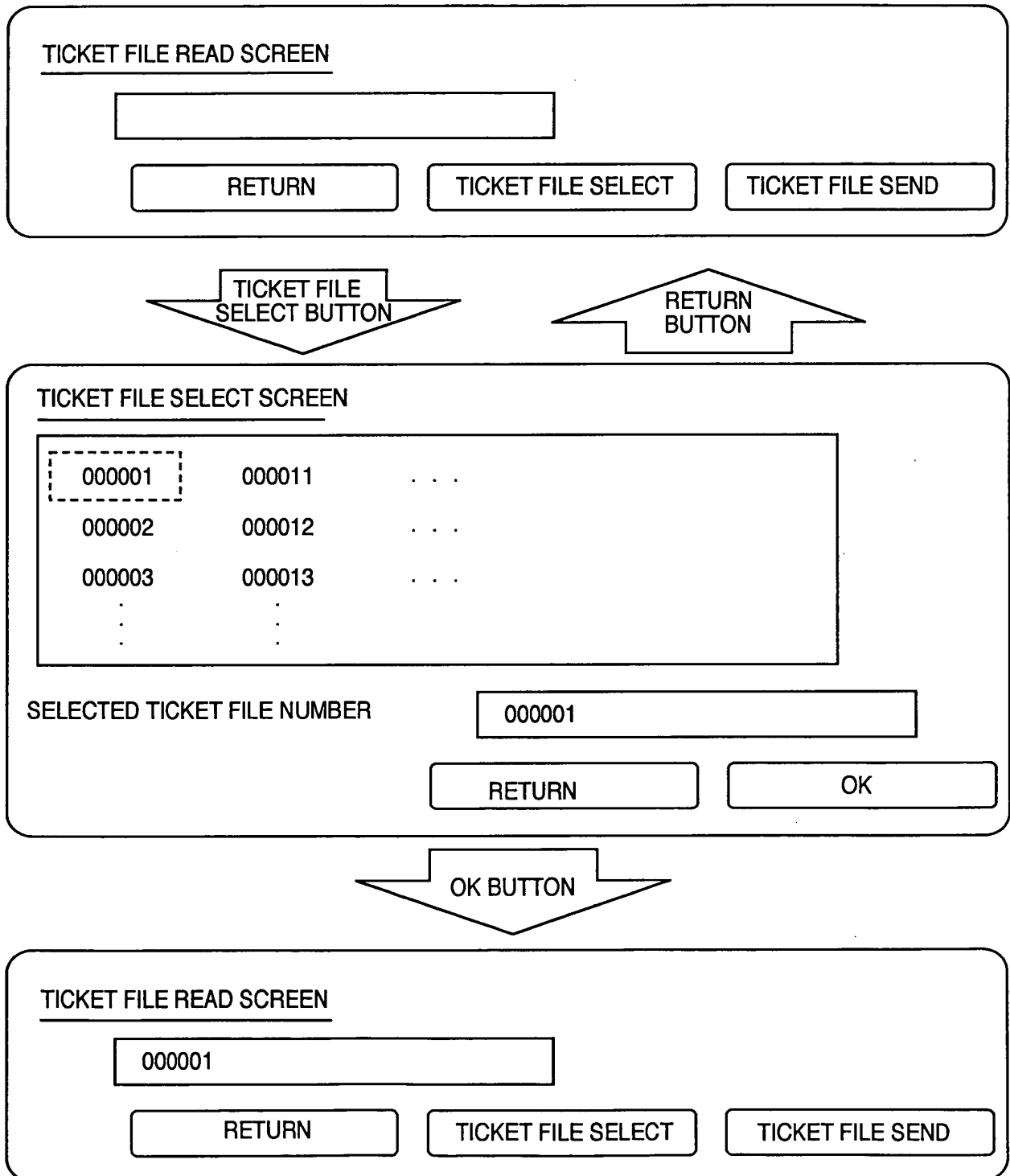


FIG.32

DATA UPDATE SCREEN

TICKET FILE NUMBER : 000002

(1) USER NUMBER	: abcdefg
(2) CALCULATION SYSTEM	: SYSTEM 1B
(3) USE FUNCTION NAME	: SUPPLY PLAN, INVENTORY ANALYSIS
(4) TABLE DESIGNATION	: WAREHOUSING/SHIPPING HISTORY TABLE WAREHOUSING/SHIPPING ASSUMPTION TABLE
(5) READ RESTRICTION	: FIXED (II AREA) (1999/01/01~2003/01/01)
(6) COLUMN RESTRICTION	: NO
(7) DATA USE TIME LIMIT	: DESIGNATE (2001/04/12)
(8) TIME-LIMIT APPROACHING NOTIFICATION	: YES
(9) NOTIFICATION TIMING	: FIXED (ONE DAY BEFORE TIME LIMIT)
(10) DATA UPDATE	: YES
(11) DATA UPDATING TIME	: FIXED (10 TIMES)
(12) TICKET FILE IS USED AFTER TICKET PURCHASE	: USE LATER

RETURN

DATA UPDATE

FIG.33

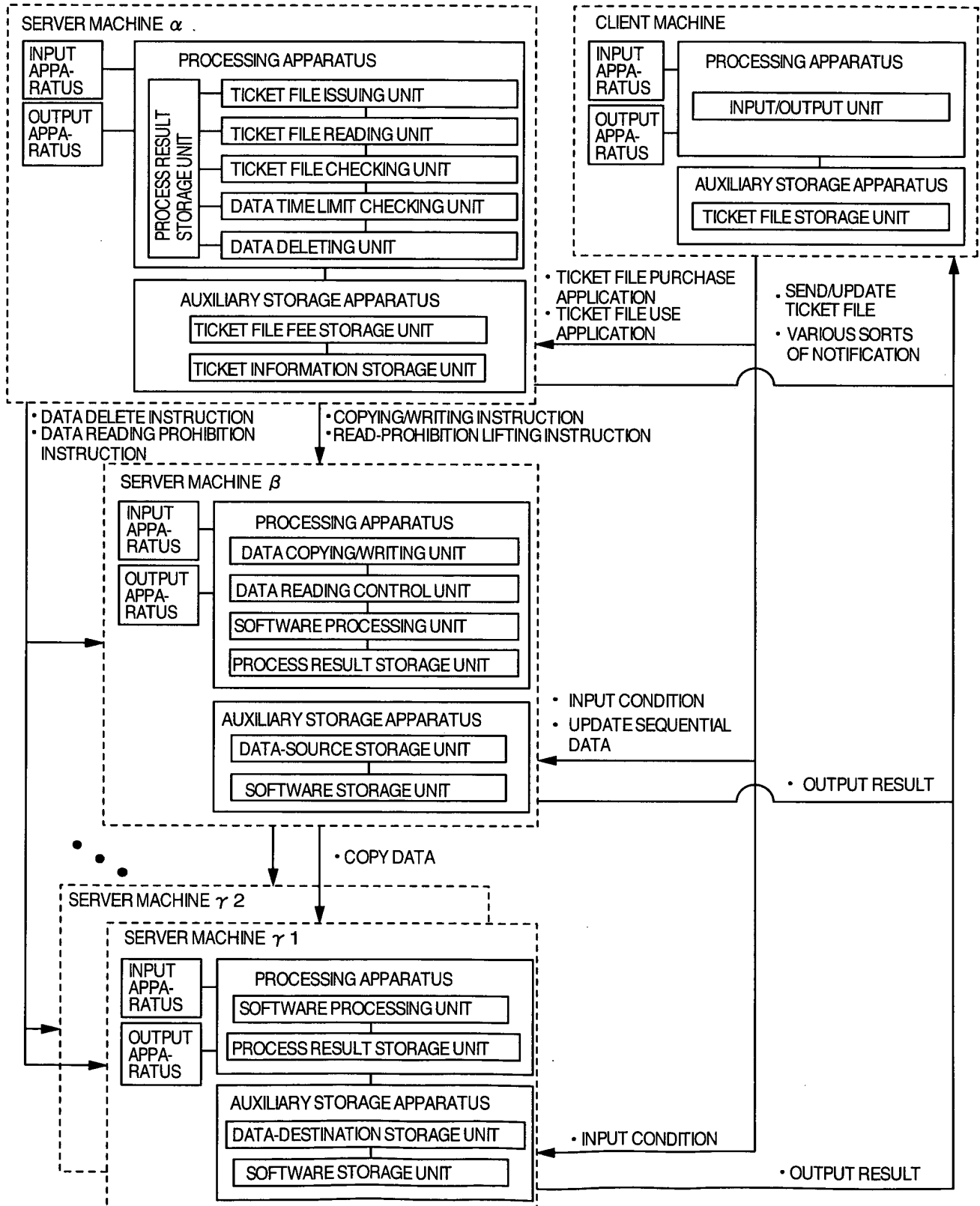


FIG.34

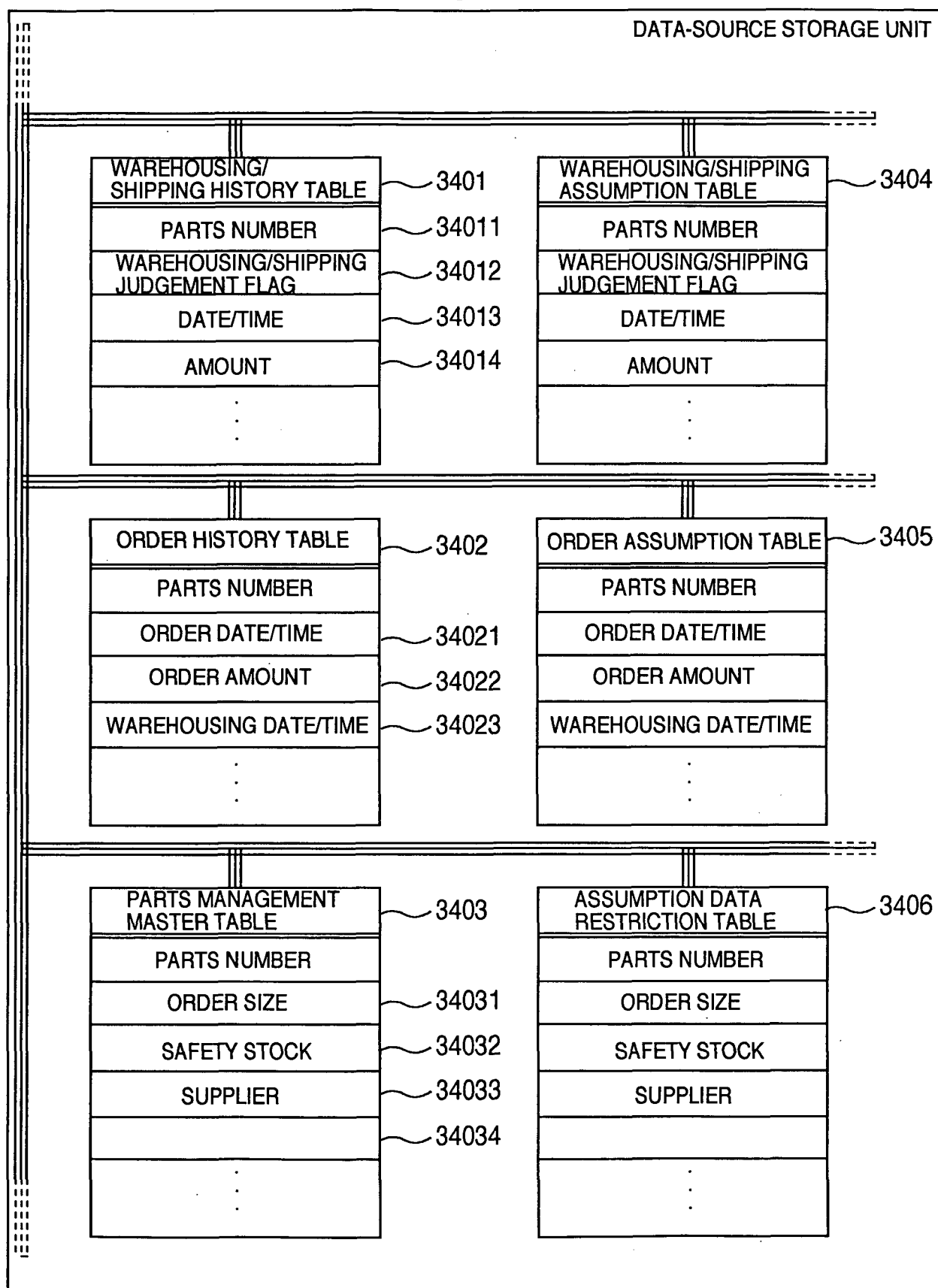


FIG.35

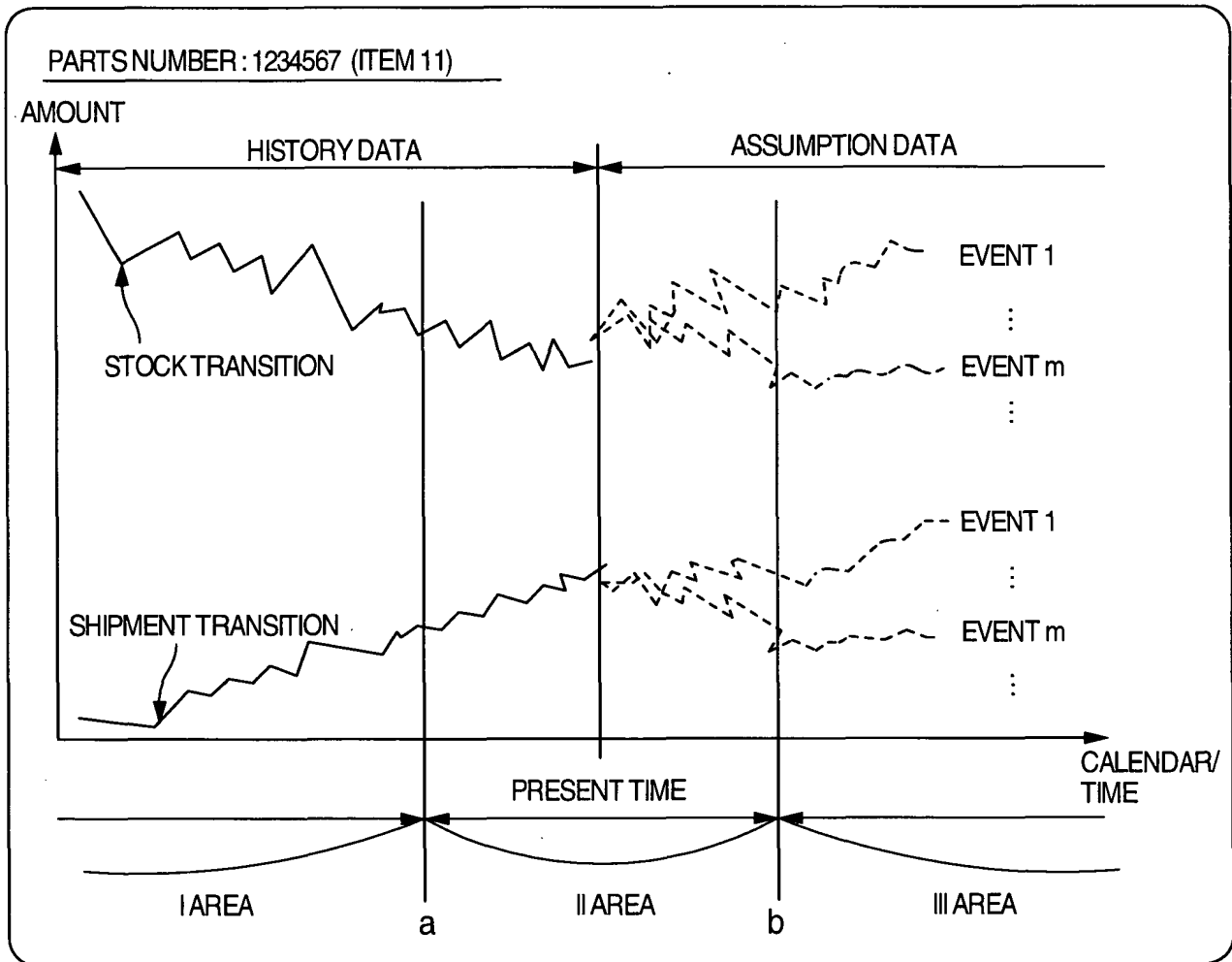
◎ WAREHOUSING/SHIPPING HISTORY TABLE

RECORD NO	PARTS NUMBER	WAREHOUSING/ SHIPPING JUDGEMENT FLAG	DATE/TIME	AMOUNT	...
1	a01	1	1990/01/01	20	
i	a01	1	1990/01/01	7000	
n	z99	1	1990/12/31	500	

◎ WAREHOUSING/SHIPPING ASSUMPTION TABLE

RECORD NO	PARTS NUMBER	WAREHOUSING/ SHIPPING JUDGEMENT FLAG	DATE/TIME	AMOUNT	...
1	a01	1	2001/01/01	400	
i	a01	1	2003/01/01	100	

FIG.36



◎ DATA AREA UNIT TABLE

AREA	RANGE	UNIT	USE PURPOSE	...
I	SMALLER THAN "a"	0.36	USED TO CORRECT SAFETY STOCK	
II	LARGER THAN, OR EQUAL TO "a", AND SMALLER THAN "b"	1.01	USED IN INVENTORY PREDICTION, SHORT-TERM DETAIL INVENTORY PLAN, AND THE LIKE	
III	LARGER THAN, OR EQUAL TO "b"	0.63	USED IN LONG-TERM MASTER INVENTORY PLAN, AND THE LIKE	

FIG.37

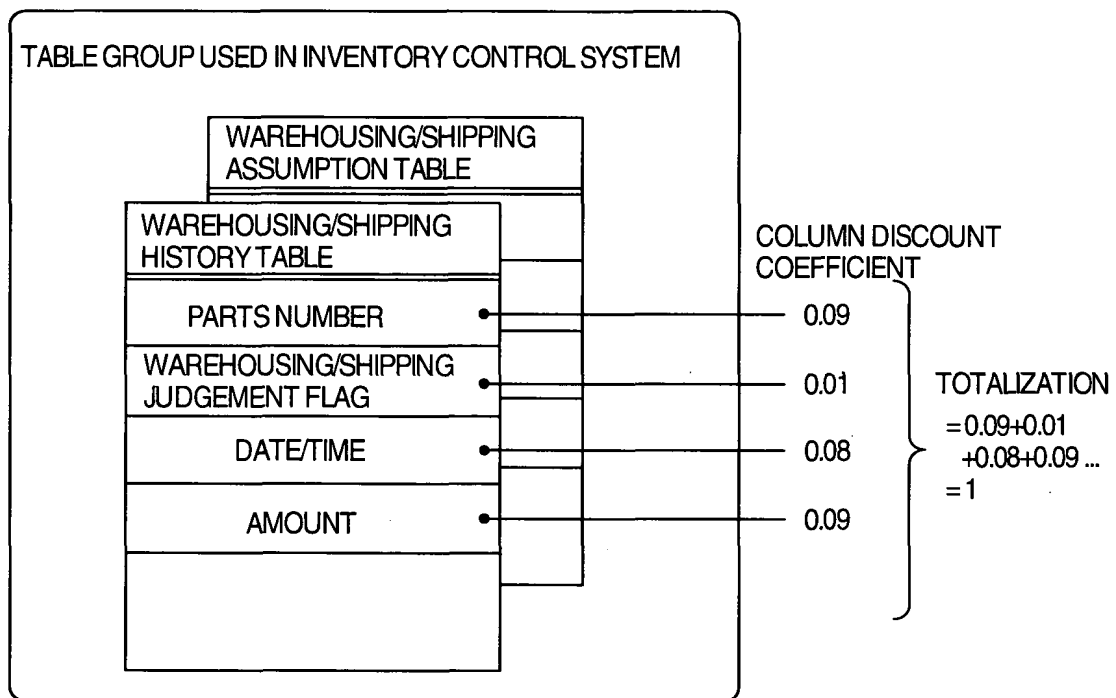


FIG.38

MACHINE-PERFORMANCE-DEPENDING UNIT PRICE TABLE

MACHINE PERFORMANCE	UNIT PRICE	...
HIGH PERFORMANCE	1000	
MEDIUM PERFORMANCE	500	
...		

UNIT PRICE TABLE FOR TIME-LIMIT-APPROACHING NOTIFICATION FEE

ISSUE/NOT-ISSUE TIME-LIMIT-APPROACHING NOTIFICATION FEE	UNIT PRICE	...
YES	10	
NO	0	

UNIT PRICE TABLE OF DATA UPDATING FEE

DATE UPDATING TIME	UNIT PRICE	...
LARGER THAN, OR EQUAL TO 1 TIME, AND SMALLER THAN 100 TIMES	10	
...		

FIG.39

CASE 1

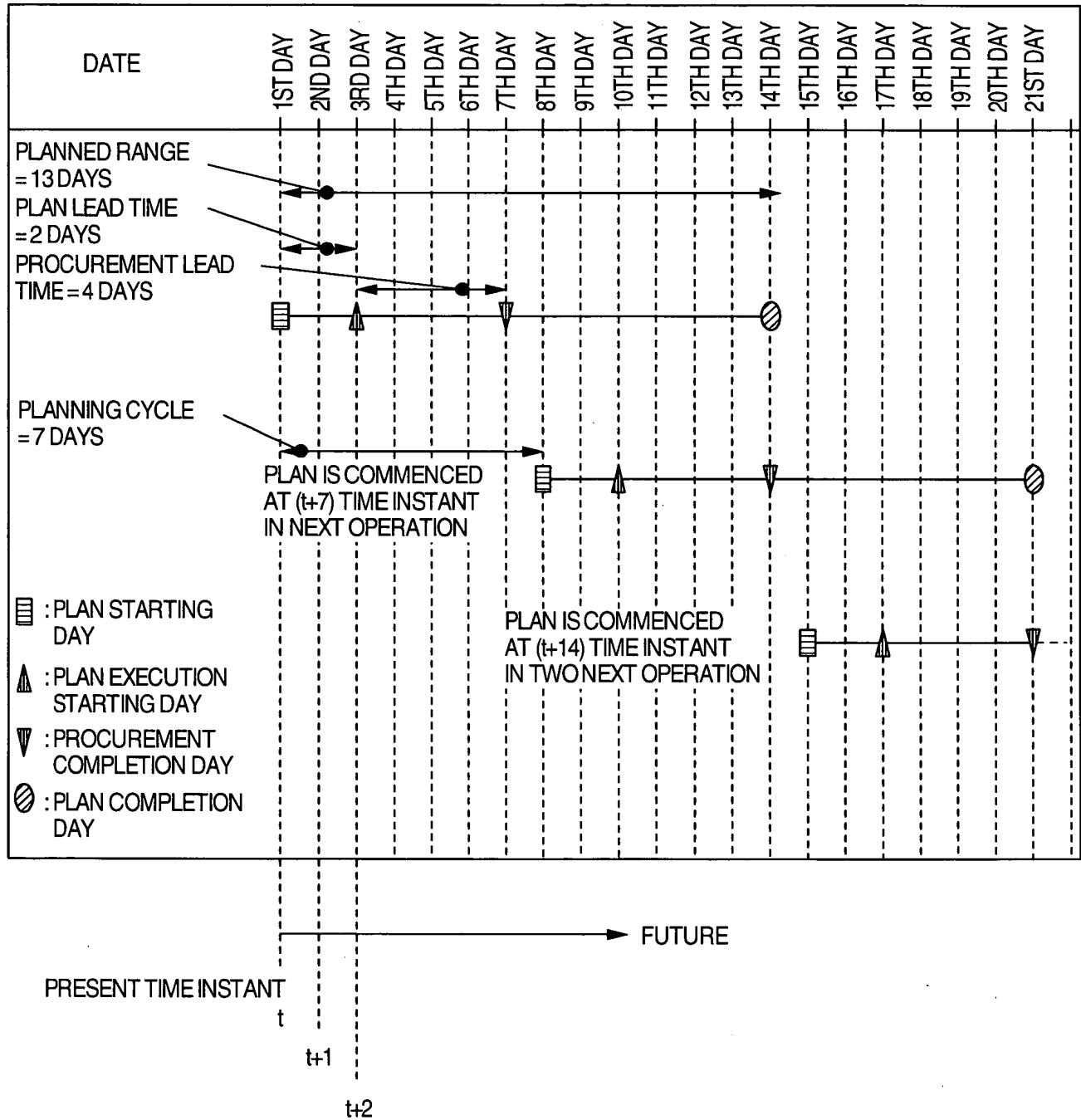


FIG.40

CASE 2

